

CACTUS AND SUCCULENT JOURNAL

Of the Cactus And Succulent Society
Of America

Vol. XXIV JULY-AUGUST, 1952 No. 4



FIG. 53. Jivaro Chief, Rio Pastaza, Ecuador.
(See page 120)



CACTUS AND SUCCULENT JOURNAL

Published and owned by the Cactus and Succulent Society of America, Inc., 132 W. Union St., Pasadena, Calif. A magazine to promote the Society and devoted to Cacti and Succulents for the dissemination of knowledge and the recording of hitherto unpublished data in order that the culture and study of these particular plants may attain the popularity which is justly theirs. North and South America \$3.00 per year; foreign \$3.50 by money order. Mail application to SCOTT HASELTON, Editor, 132 West Union Street, Pasadena 1, California. Editorial Staff: THE ENTIRE SOCIETY. Entered as Second Class Matter at Pasadena, Calif., under act of March 3, 1879. Published bi-monthly. We reserve the right to accept or reject advertising or articles sent to this JOURNAL.

Vol. XXIV

JULY-AUGUST, 1952 (PRICE 50c)

No. 4

An Interesting Agave.....	J. R. Brown	99
Vincent Mason Grows Cacti.....	Estelle Mason	100
Mexico, Part II.....	Howard E. Gates	104
Studies in the Crassulaceae.....	P. C. Hutchison	106
The Desert Tortoise.....	G. McGonigal	109
Methods of Collecting Cacti for the Herbarium and Botanical Garden, Part II.....	Elzada U. Clover	110
Dig Your Own.....	Richard Kolasinski	113
Notes on a New Group of Pereskias.....	Harry Johnson	114
Flowering Cacti in Idaho.....	Carl Henscheid	116
Growing Cacti Out of Doors the Year Around.....	Homer Rush	118
A Cactus Collector in the Andes, Part III.....	Harry Johnson	120
Cereusly Speaking.....	John E. C. Rodgers	123
Don't Wait for the Sunshine for Color Pictures.....	R. C. Proctor	124
So Ya Wanna Grow Cactus, Part IV.....	Wm. Mastrangel	126
Spine Chats.....	Ladislaus Cutak	127

ODDITIES IN THE SUCCULENT WORLD

(Send in your most interesting photos.)

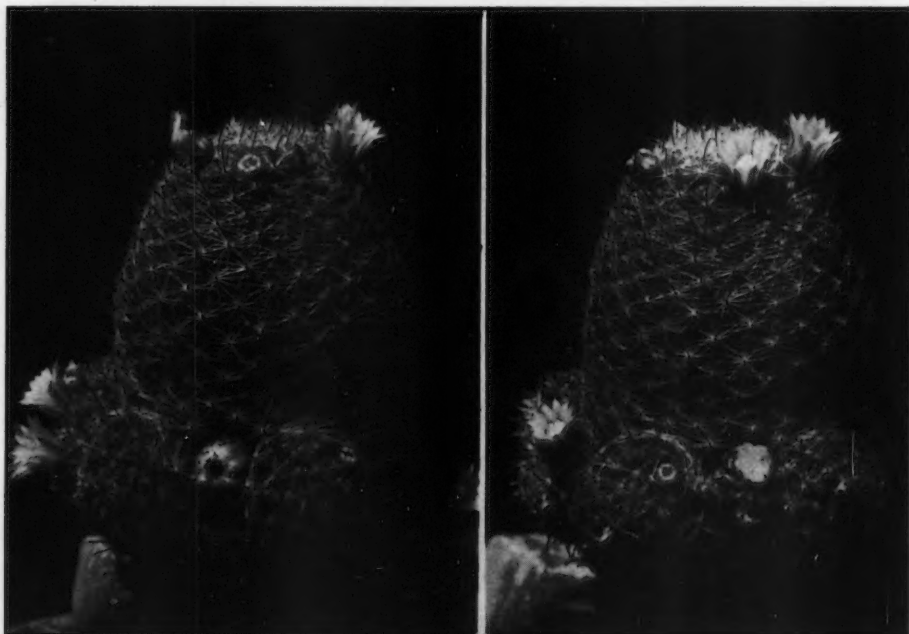


FIG. 54. The large fruit on *Mammillaria pygmaea* shown in the photo on the left was observed by E. C. Hummel in his Inglewood gardens. Upon opening the fruit (see photo on right) it was found to contain a flowering plant instead of the usual pulp and seeds.

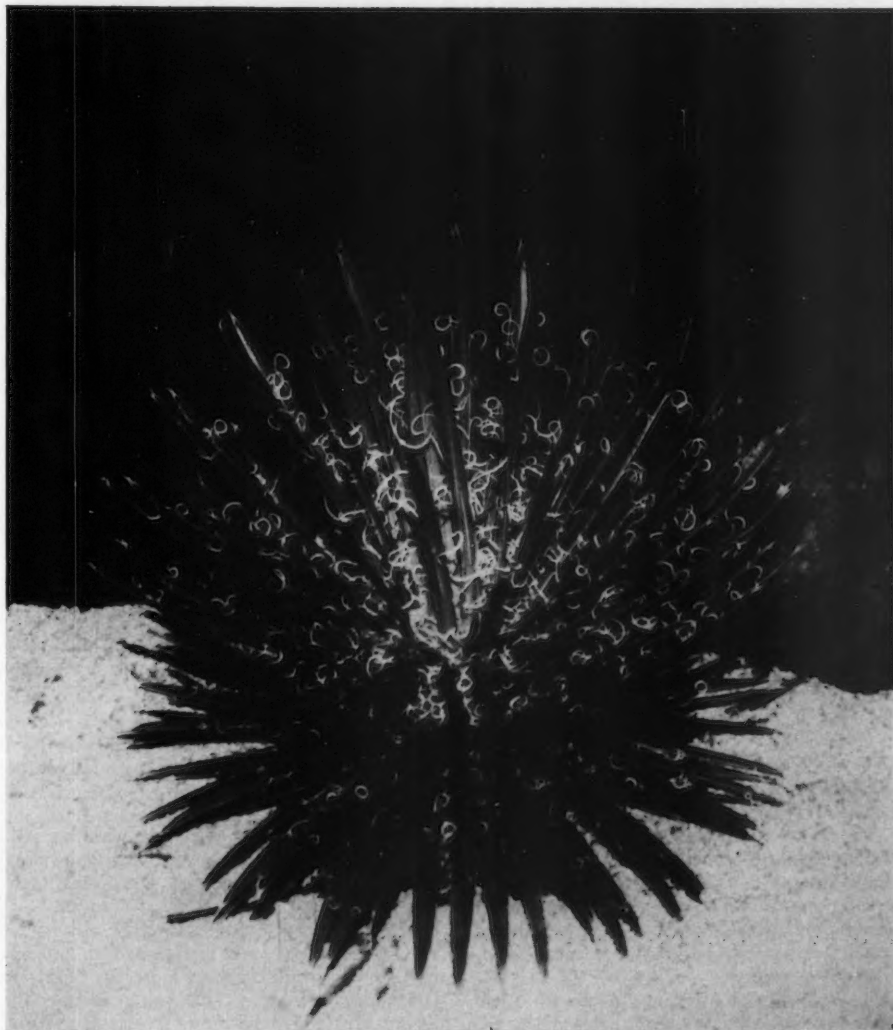


FIG. 55. *Agave Leopoldii* II approx. $\times 0.25$

AN INTERESTING AGAVE

By J. R. BROWN

Agave Leopoldii II Hort. is one of the better, small, decorative Agaves. It is a hybrid between *A. filifera* and *A. schidigera* and was raised by a Dr. W. B. Kellock of England about 70 years ago, and named by him for King Leopold II of Belgium.

The most interesting feature of this plant is the manner in which the white marginal threads curl into little ringlets, the curls being in almost

opposite pairs, giving this Agave a distinction all its own.

The plant shown in the illustration of this Agave was about 40 cm. in diameter; the leaves deep green but turning brownish-green in the sun, linear, with one or two whitish lines or streaks on both surfaces, and terminating in a 5 mm. long, brown end-spine, which becomes gray in age.



FIG. 56. A group of experiments in Vincent Mason's glasshouse.

Vincent Mason Grows Cacti

By ESTELLE MASON

Vincent I. Mason, of Newtonville, Massachusetts, has one of the finest collections of rare and unusual cactus and other succulent plants in New England. This choice display had its humble beginning in a dish garden which outgrew its dish, and, before long, outgrew the house.

Come along with Vincent and me on a tour through the greenhouse to see the plants, which he raises as a hobby. Let's start on the north side. On the first bench are small Mammillarias with their rings of tiny flowers like haloes around the top of each plant. As we make our way around the greenhouse, you will see approximately 2000 plants, about 800 different kinds of cacti, many choice Adromischus, Bromeliads, Crassulas, Echeverias, Haworthias, Kleinias, Lithops, Sedums, and Stapeliads. At the last bench you will see a most unusual hydroponics experiment which Vincent has been carrying on since January, 1950.

One whole section of the greenhouse is devoted to plants which Vincent grows just to give away. Many of these are surplus plants, and others he grows because they are fairly easy

for a beginner. Most everyone who visits the greenhouse likes to take away with him some little plant. Wherever we go, the hostess seems to enjoy an unusual house-plant. Vincent and I have many times enjoyed meeting old friends whom we haven't seen for years. The conversation almost invariably starts like this. "How are you and the children? Do you remember that little cactus you gave me ten years ago? Well, you should see it now. It is so big and last year it had a flower!" It is always pleasing to think that some little plant you had long forgotten had for so many years given pleasure to a friend.

If you are acquainted with succulents, you will notice that all the plants are catalogued. They are arranged throughout the greenhouse according to their botanical groupings. The Mammillarias are together, the Cerei, etc.

If you are less well acquainted, Vincent will tell you the popular names of the plants, such as "birds-nest cactus," and "pincushion." He likes you to ask questions, and he knows most of the answers. Vincent can tell you the natural habitat of each plant, facts about their environments, and, in many cases, by whom they were

discovered. In many instances, the plant is so rare that it has not even been named. Vincent tends these unnamed plants and watches carefully for their bloom as it is usually the flowers which distinguish plants, and no plant gets its official name till its flower is seen.

Many of these plants are grown from seed. Vincent enjoys growing plants from seeds in preference to mature plants, as then he has the pleasure of watching the development. He has exchanged seeds and plants with people from all parts of the globe.

The prefabricated construction of the 25' by 15' greenhouse in our back yard was, from the start, more or less a family affair. Vincent chopped down trees, and the children and I helped him clear the woodland to make room for it. We helped gather stones when he poured the cement flooring. We also helped him build the brick chimney. The pit down the center of the greenhouse gives added head room to the 8½' ridge for tall growing plants. The pit measures 12' by 4' and the surface of the pit is 18" below the rest of the flooring.

You will probably notice that the greenhouse is as tidy as a laboratory and remarkably free of insect pests. Vincent inspects and quarantines EVERY plant before he adds it to his collection so that all plants, at least start in the greenhouse, free from insect pests and diseases. If, at regular inspection times, he finds something suspicious it is treated immediately. To commercial insecticides Vincent adds his own concoctions. (Did I tell you that he majored in chemistry?)

Within the confines of his New England greenhouse, Vincent tries to give his plants the conditions as near to those which exist in their natural environment. He says that the alkalinity, porosity, size of soil particles and amount of nutrients in the soil are all of great importance. He found, largely by trial and error, that the soil mixture he uses may not be correct for the person living in a neighboring community, due to variants in soil ingredients. Very fine soil particles hold moisture over too long a period, which may cause soil to sour; too coarse particles allow the moisture to run out rapidly, so that the soil dries out too fast.

Once a month, beginning in April, through August, Vincent uses a commercial fertilizer which contains trace elements (TracEL). The watering schedule is also increased through this period and tapered off gradually through the winter months.

The plants are watered thoroughly and then allowed to dry out. Because Vincent found from experience that the size of the pot has a great deal to do with the speed of water evaporation, he has a watering schedule based not only on

the needs of the individual plant, but on the size of the pot as well. Therefore you will notice on his wall-calendar, worked out in mathematical precision, something like this: Monday, North bench: Cacti, small pots (under 3 inch diameter). Tuesday, South bench: Echeverias, Stapeliads. Wednesday, all large pots . . . etc. In this way nothing is left to chance and nothing overlooked.

You will perhaps wonder at the gadgets which seem to abound in the greenhouse. These are all the products of Vincent's inventive mind. Automatically-controlled hot-air-heat blown through 8" ducts under the benches, keeps the winter temperature at 55 degrees. The automatic window openers are thermostatically controlled. The watering reel and spray attachment have received much publicity. The overhead stainless-steel water storage tank allows the water to become the same temperature as the greenhouse so as not to shock the plants with icy New England water, and also allows the chlorine to disperse.

Here is one incident to illustrate Vincent's inventiveness. He found that during a sudden summer thunder shower, because the temperature often remained high, the top ventilators sometimes stayed open, allowing the downpour to damage choice plants. He overcame this by erecting a delicately-suspended, six-inch pan which, under the weight of a few raindrops, made an electrical contact and so closed the windows! The pan has a small hole in it which allows the rain to run out, and when empty the contact breaks and so the ventilators open again. Vincent was puzzled one day to find that his gadget didn't work. It seems that a bird passing overhead had thrown his delicately balanced mechanism out of kilter!

The concrete flooring helps to control humidity. The concrete also cuts down on the termites which were eating out the supports; the field mice which liked the warmth for nesting; and even a house wren. We still haven't figured out how the small bird got in.

Even in New England the direct summer sun is too intense for cacti and succulents in the greenhouse. Many times the temperature went as high as 130 degrees in spite of the ventilators. Therefore, the second year, he constructed sets of laths from scrap aluminum which he had about the shop. The laths fit just under the top of the glass roof. This deflects the heat and cuts down the direct rays of the sun about 40%.

The first summer we had the greenhouse, many of our plants were sunburned, particularly the tall-growing ones. When Vincent realized what was happening, he decided against whitewash, which is used in many greenhouses. His idea was to tack up ordinary cheesecloth, so he

went shopping for it. When he came home he sheepishly untied his parcel. "It isn't just what I wanted, but it will have to do." Then he showed me the most beautiful, dainty, "permanent-finish" pink organdy. Well, needless to say, I didn't let him use it. No, sir. I made pink organdy curtains for our home. The greenhouse? Oh, I bought cheesecloth for that.

In his greenhouse Vincent can control the temperature, the water, the humidity, and the soil, etc., but one of the factors not under his control is the intensity of the sunlight (the ultra-violet rays). There's nothing he can do, either, about the altitude, as we are approximately 50 feet above sea level. Certain plants which grow in the mountains need a higher altitude. If he can find a way to bring Arizona sunlight and the mountains to this part of New England, he would really have something. Well, if I know Vincent and his inventiveness, it wouldn't surprise me if some day he did even this seemingly impossible feat.

He has worked everything out so efficiently that when our daughter Pennie was only 10

years old she was able to take care of the greenhouse while mother and daddy were away on vacation.

Our greenhouse is a relaxing, absorbing, stimulating hobby. The geometric designs and mathematical precision of each spine and ridge, leaf, and spiral is pleasing to Vincent's scientific and artistic mind. The flowers are an added dividend. Though they are fun, cacti and succulents are not too demanding of time and energy.

Vincent has many other interests. He has several tanks of tropical fish around the house, and has become an expert on exotic fish and aquarium plants. His mineral collection, mostly crystals in the matrix, is worthy of a complete article in itself. Many of his inventions have had national acclaim. Many others we "take for granted" around the house and greenhouse.

As our second son Brad said: "My daddy doooooos everything." As far as growing and flowering cacti and succulents go, I guess he does.



FIG. 57. Always new things to see in a well-kept glasshouse.



FIG. 58. Colony of *Beaucarnea* near Zapotitlan de las Salinas.

MEXICO

By HOWARD E. GATES

PART II

We went on over another ridge and down another canyon to the fairly broad valley in which lies Zapotitlan. Enroute we frequently paused to look at groves of arborescent Yuccas, Agaves, terrestrial bromeliads as well as numerous small cactus. These included clusters of *Ferocactus robustus*, the clustered but larger headed *Ferocactus flavovirens*, and the single headed but very colorful *Ferocactus nobilis*. In the shelter of shrubs, were *Mammillaria mystax* and a straw colored clustering one with elongated heads that we could not place unless it is a variety of *Mammillaria elongata*. Around the town of Zapotitlan de las Salinas, we found colonies of *Lemaireocereus hollianus* and also hedge rows of them around the farms. At home we know this as a rather weak and slender branched pot plant. Here it was growing to twenty feet tall with numerous straight branches to six inches in diameter. Its few fruits were on the very tips of the branches and they were the largest cactus fruits I have ever seen. Some were three and a half inches in diameter and four and a half inches in length, well covered with clusters of long spines. When ripe the red pulp within the thick walled cavity was almost a liquid, so it is probably not a good fruit to sell on the markets. On a slight knoll in the valley beyond Zapotitlan was a colony of gigantic *Beaucarneas*. The immensely swollen base of the tree trunks, often four to five feet through, soon tapered and divided into branches each crowned with long slender drooping leaves above which stood the many branched but very small flowered inflorescence stems. My kodachrome of this colony with a few giant cactus in the background and the colorful mountains outlining the distant canyon under the summer clouds in the sky, I consider the most beautiful of all those I made in Mexico. While seeking a good position to photograph the *Beaucarneas*, I came

upon a dense colony of *Mammillaria sphaelata* plants. The individuals consisted of rounded, often clustering small heads covered with short light colored spines with darker and slightly longer centrals.

The road led on enticingly down the valley toward distant mountains and even though I knew we had not located half the interesting things of the district, the lateness of the day demanded that we turn back if we were going to get over the grades and the rough roads that lay between us and a good bed in Tehuacan.

In the morning we photographed the grounds of Villa Granada with special attention to a yellow flowered Poinsettia. The Vera Cruz road lured us northward along the arid western slope of the Sierra Negra until it turned and boldly took over the wooded mountains to the east. At the very summit appeared a magnificent vista of the valley leading to the tropical low lands. The slopes were well covered but the bottom apparently in a rain shadow was rather arid. It took some four miles of winding grade to reach the bottom. Here we found a few scattered colonies of an arborescent giant cactus too far from the road to be properly identified. In the cotton textile manufacturing town of Rio Blanco we found a park packed with cypress trees trimmed into strutting peacocks, flying birds, burros, rabbits, dogs and umbrellas.

Closer to Orizaba we found many teams of oxen plowing in the fields. A large and powerful breed of cattle are used for oxen. Their necks were fitted with yokes. Though the plows were steel shared and some times steel beamed, none had more than a single handle. As we rolled along over smooth asphalt pavement, it seemed strange to pass many packers using head bands to enable them to carry great sacks of produce on their backs to market. We photographed three men, each carrying huge sacks of onions. Beyond Orizaba the country became more tropical and a heavy

green growth was everywhere. There were many plantations of bananas and sugar cane. Palms were abundant. The orange groves were attractive but the fruits are always greenish and never attain the high coloring of those grown in more temperate climates. Near Fortin de las Flores, whole fields were given over to the cultivation of gardenias for the cut flower market. At Cordoba, the country became so tropical we thought there was no point in going farther in our search for interesting cactus and turned back to spend another night in Tehuacan.

Upon our return to Mexico City, we joined the Sunday morning throng at the floating gardens of Xochimilco. At one time these gardens grew upon floating masses of debris in a lake. Now the territory is drier and the floating islands became anchored to form rich vegetable and flower gardens, intersected by numerous canals. Every Sunday morning the Indians decorate the fronts of their flat bottomed boats with arches and fanciful designs done in bright colored flowers. From four to a dozen chairs are in each of the boats which are poled down a broad canal between the gardens and back again. Other flat bottomed boats carry photographers and salesmen of bright serapes and novelties. Boats carrying orchestras drew up alongside and for a small sum would render a serenade. Small dug out canoes were packed with crushed ice in which drinks were imbedded to cool. Other canoes were filled with vendors of flowers and fruits. Small purple orchids were sold as cheaply as the commonest flowers at home. A distinctive feature of this area are the rows of tall trees resembling Lombardy poplars which line the canals. Another is an abundance of tiny plants floating on the water. On shore nearby were cafes and a market place with an abundance of attractive and usually very colorful merchandise.

For a couple of hundred miles west of Mexico City, the road stays high in the wooded mountain country. Through this area were many flowering trees and shrubs. Occasionally Agaves were noted on the slopes. We did not see any cactus other than occasional *Opuntias*.

We never regretted that we took time to turn off the main highway to Uruapan and the youthful Paracutin Volcano. Most of this side road winds through

many conical hills, every one of which appears to be a volcanic cinder cone. These hills are covered with a pine forest which forms the basis of a lumbering industry. The squared timbers are lashed to the sides of burros and with the ends trailing, are carried to town. We found accommodations at the Posada Bugambilia. Probably you will recognize its flowery namesake in the pronunciation rather than the spelling. Just outside of the city is a national park surrounding the place where the Devil is said to have stumbled and fallen. Where his elbow hit the ground, immense springs gush forth to form a beautiful river. In spite of the elevation, this district is tropical. Coffee grows in the park and the trees carried bromeliads and blooming orchids.

Since part of the road to Paracutin is very rough and the bridges merely logs laid together, we preferred to hire a taxi for the trip to the volcano. In most of Mexico, taxi cabs may be secured for a flat rate of about a dollar an hour regardless of the number of persons. We arrived at the lava flow about an hour before dusk as the volcano is most spectacular at night. A village of two thousand persons was almost completely buried in lava shortly after the volcano sprung up in a corn field in 1942. In an air line, this village was some two miles from the crater. At the time of our visit there was a continuous rumble and a pillar of smoke ascended into the sky. I took the short trip over the lava flow to where the large church had been buried to the base of its steeple. On the way I noted corners of houses and garden walls protruding from the edge of the lava. Many of the tourists rode on ponies up toward the crater where the rocks are still warm and the rivers of glowing lava seem almost under foot. This and the floating gardens are two places that really live up to the advertising.

Uruapan is the center of the inlaid Mexican lacquer work. The Indians rough out wooden bowls and trays in their mountain homes. In numerous home industry establishments in the city, the bowls are completed and covered with a heavy coat of lacquer. The designs are cut out of this base coat and lacquer of various colors inlaid to complete intricate designs of birds and flowers.

Upon returning to the highway we headed westward



FIG. 59. Commercial Agaves by the acre on the road to Guadalupe.

again. Speaking of highways reminds us that we must not miss mentioning the motor bus systems of Mexico. It is a big business that extends everywhere even to the back country roads. There are all sizes, shapes and colors in first, second, third and mixed classes. Along the top of many busses is a rack for carrying freight. If a farmer has a few sacks of produce, a crate of chickens or a bundle of baskets to go to market, he merely takes them to the nearest bus route and his freight is carried on top while he rides inside. On Sundays and holidays, so many people line the roads waiting for the busses, one wonders where enough will be found to carry them all.

East of Mexico City we saw many farms planted to broad leaved dark green Agaves. These spread widely with drooping tips. Over in this territory to the west we found great plantations of a narrower, gray leaved and more erect species being used for cultivation. The plants were regularly spaced about ten feet each way in rows and often the dangerous terminal spine was trimmed off the leaves. We were told that Agave plantations were so profitable that if a native owned two thousand plants or more, he could afford to own and operate an automobile.

Guadalajara was rather a disappointment to us even though it is the second largest city of the Republic. We found it to be just that. A large city without spectacular features set in a broad valley devoted to cattle raising. The most interesting spot was the suburban village of Tlaquepaque, a center of Indian pottery making. The work is done in numerous small establishments by hand. No stencils are used and even the decorating of great six foot urns is done by free hand painting. We found the workmanship good and the prices un-believably low.

West of Guadalajara is the great canyon known as Las Barrancas, whose engineering and construction difficulties delayed the building of a motor highway from the west coast for many years. In the bottom of the barranca we passed some gigantic plants which appeared to be *Pachycereus pecten-aboriginum*. Then west of the barrancas, we passed through a lava flow in which were *Pachycereus*, *Cephalocereus leuccephalus* and a smaller cereus that we did not recognize. *Cephalocereus leuccephalus* is interesting in that it produces a goat's beard cluster of woolly spines on the cephalium side of the branch.

Tepic we found to be a progressive city on the edge of the coastal tropical district. We were unfortunate in our hotel assignment. The room was on the second floor just over the bar room and a half a block away was the cathedral whose bells rang intermittently all night in connection with ceremonies for the Day of the Dead. In the morning we passed many persons bearing wreaths of natural or paper flowers to decorate graves.

Between Tepic and the port of San Blas, we got our first glimpse of wild poinsettias in blossom. They appeared to be nearly as large as the kinds we cultivate in our gardens. The road to the shore wound down through a wet tropical jungle characterized by several kinds of graceful palms. A few giant cactus grew on low hills rising above the jungle. Along the shore were groves of coconut palms and several large resort hotels.

From San Blas northward, the highway lies about twenty miles inland at the upper edge of the jungle and yet outside the mountains. Three times we had to ferry and twice to ford rivers. At the widest river the ferry was attached to cables and nudged across by a motor boat. At the other two, transit was accomplished by men pulling on cables. As each ferry was able to carry only two vehicles, some times there were delays in crossing.

About seventy-five miles south of Mazatlan, *Pachycereus pecten-aboriginum* became abundant and there were a few *Acanthocereus*. One of the striking features of western Mexico was the great abundance and variety of morning glories. To one accustomed to the more arid peninsula of Lower California, it was strange to see them draped over the tops of giant cactus and tall trees. Mazatlan is a city of forty thousand setting on a small peninsula jutting into the sea. Rugged hills form headlands protecting small bays on several sides and a good commercial harbor on the south. It is just a few miles south of the Tropic of Cancer and was the warmest place we visited in our whole month in Mexico. We had a large fifth floor bedroom with its own private balcony overlooking the Bay of the High Waves. We noted there were only a pair of sheets and a thin spread on each bed. At our request the maid brought us blankets but we never used them. In fact most of the nights we were not even under a sheet. The hills behind the city are quite well covered with trees and shrubs. The only two cactus I could find were *Pachycereus pecten-aboriginum* and *Acanthocereus occidentalis*. However, there was a furry broad leaved weed whose leaves clung so tenaciously to clothing that they would tear to pieces before they could be pulled off. Possibly this was the cause of an itch that caused my legs to swell and be irritated for six weeks.

When we were ready to leave Mazatlan for Durango on Monday morning, there was not a liter of gasoline at any service station in town. As it was noon before we were able to purchase the sixty liters we needed, we were forced to stay over for another night. The hard surfaced road gave way near Concordia to a well graded dirt road and as we ascended into the mountains this in turn became a single track road cut into the mountain sides and climbing right up over ridges. The tropical jungle of the low lands gradually gave way to a dense growth of other types of trees and shrubs. As we ascended we passed through areas with poinsettias, various agaves and bromeliads and after hours of travel came into an immense pine forest on the summit and eastern slope of the Sierra Madre of the West. The dot on the map marked El Salto proved to be a lumber company town of some ten thousand. From this point a splendid new highway led through upland grazing country and scattered farms to Durango. We consider the two hundred miles from Mazatlan to Durango, to be the most scenic of any day's travel in Mexico. This road is the only un-completed section of the Matamoros to Mazatlan cross country highway. Even though it will soon be paved, it will never be a very high speed road on account of the many grades and sharp curves.

The loquacious traveler always seems impelled to make some remarks for the benefit of those who follow his footsteps. The roads indicated on our maps as all weather highways are well engineered and good. The usual speed limit is about fifty miles an hour though a long straight stretch in Chihuahua is posted with an eighty mile limit. Straying cattle which wander over the highway at will are greater hazards than the traffic. The supplying of gasoline seems to be the monopoly of a government owned corporation. Consequently there are never three competing service stations at an intersection. In country districts, service stations are widely spaced and in cases a hundred miles apart. Consequently it is never advisable to pass a service station unless the gas tank is at least half full. Repair garages and auto agencies are only found in the larger cities and towns. It is well to carry a few small parts as fan belts, spark plugs and breaker points in addition to a good jack and tire repair materials. All of the cities are connected by air lines. Travel by air is more

Concluded on pg. 128

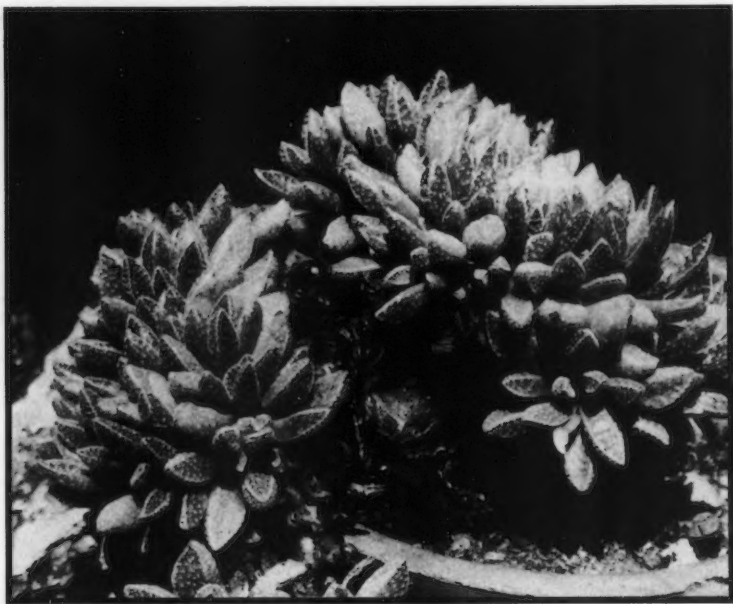


FIG. 60. *Crassula ausiensis* P. C. Hutchison, sp. nov. Plant in the collection of Dr. Meredith Morgan, Sr. Photo by author.

Studies in the Crassulaceae

1. *Crassula ausiensis* P. C. Hutchison, sp. nov.

By P. C. HUTCHISON*

Some ten years ago a plant labeled *Crassula Hofmeyeriana* was observed in the collection of succulent plants cultivated by Dr. Meredith Morgan, Sr., of Richmond, California, who had obtained it from Wilhelm Triebner of Windhoek, Southwest Africa. It was a plant of unusually attractive form and was of special interest to me because it had been used as a parent in a series of hybridizations which Dr. Morgan had undertaken to improve the bloom and foliage of several of the more compact dwarf species of Crassulas. Subsequently I attempted to find the original description of this species in order to check its identity, only to discover that the name was a "nomen nudum" created by Dinter. Dinter's comments about *C. Hofmeyeriana* were very fragmentary** it grew in white quartz with *Anacampseros Dielsiana* Dtr. in the

"Aus-Gububer Granitmassiv"; it was a small plant with short, white-haired rosettes and white flowers. The Morgan specimen corresponded in floral and vegetative details with Dinter's remarks, and, although no locality data were given by him, the fact that it had come from Triebner seemed a favorable indication of its having been collected at or near Aus, which was not a prohibitive distance from Windhoek for such an energetic collector as Triebner. Without further data or material, however, the identity of the Morgan plant with the meagre description of Dinter could not be determined conclusively.

In 1950 in a shipment of Crassulaceae from Mr. H. Herre, Curator of the Stellenbosch Botanical Garden, South Africa, a plant was received at the University of California Botanical Garden (Berkeley) under the name *Crassula Hofmeyeriana* which resembled the Morgan plant in many respects. It had been collected by Dr. A. L. Geyer in the Warmbad District of Southwest Africa in 1948. I wrote to Dr. Louisa Bolus, Curator of the Bolus Herbarium at Cape Town, asking for information about the Dinter collections and inquiring whether they had

*University of California Botanical Garden (Berkeley) Contribution No. 123.

**"Ein neues *Anacampseros* (*A. Dielsiana* Dtr. mss.) fanden wir nicht selten in den Spalten weisser Quarzgänge, fast stets zusammen mit den kleinen kurzweichhaarigen weissblühenden Rosetten der *Crassula Hofmeyeriana* Dtr. mss."—in *Repert. Sp. Nov.* 23:19. 1923.

sheets of his which carried this name. Dr. Bolus kindly forwarded three sheets, two of them containing collections of Dinter, with the name *Crassula Hofmeyeriana* Dtr. on the sheets in Dinter's handwriting. The plant which we had in cultivation from Dr. Morgan was obviously the same species. Since the name *Crassula Hofmeyeriana* has not been validly published, this plant is described here as a new species. The name chosen by Dinter was probably in honour of the late Administrator of Southwest Africa, who was in office when Dinter was collecting there, but since Mr. Hofmeyer is not known to have been connected with this plant in any way, the more appropriate name *Crassula ausiensis* has been chosen.

Crassula ausiensis P. C. Hutchison, sp. nov.

Crassula Hofmeyeriana Dinter, nom. nud., in *Repert. Sp. Nov.* 23:19. 1923. in obs.

Planta densa nana succulenta usque ad 9 cm. alta caulibus cortice fusco squamoso obtectis foliis subrotundatis vel decussatis obovatis vel maturatis oblongis 9-17 mm. longis 3-8 mm. latis marginibus ciliis crebris retrorsis dealbatis paginis eodem modo floccis ciliorum retrorsorum dealbatis inflorescentia terminali pedunculis gracilibus 2.5-8 cm. altis glomerulos florum subcapitatos vel subpaniculatos gerentibus ciliis brevissimis retrorsis (ut apud bracteas calycemque) obtectis sepalis deltoideo-lanceolatis concavis ca. 2 mm. longis basi 1.3 mm. latis marginibus dorsisque (lacinia angusta subglabra marginibus parallela adjectaque tantum excepta) dense ciliatis petalis albis erectis patentibus vel apice recurvatis ca. 6 mm. longis ad apicem versus ca. 2 mm. latis carpellis ca. 2 mm. longis stylis brevibus recurvatis squamis luteis late obovatis concavisque 5 mm. longis apice truncato 5 mm. latis.

A dwarf, compact, freely branching succulent to 9 cm. high, forming densely clustered rosettes of leaves; stems stout, knotty, covered with a scaly brown bark which usually splits in age to reveal the naked stem. Leaves closely approximate, subrotulate or, especially in younger plants, decussate, obovate to oblong when ma-

ture, 9 to 17 mm. long, 3 to 8 mm. wide, usually somewhat wider than thick, barely concave on inner face, convex on outer, the margins whitened by dense retrorse cilia, the surface whitened by tufts of retrorse cilia. Inflorescence terminal on peduncles arising from center of leaf rosettes. Peduncles slender, erect to somewhat lax, 2.5 to 8 cm. tall with 1 to 3 pairs of small lanceolate bracts and bearing a subcapitate to subpaniculate cluster of flowers. Peduncle, bracts and calyx covered with minute retrorse cilia. Calyx green or reddish-brown-tinged, the sepals erect, united at base, deltoide-lanceolate, ca. 2 mm. long, ca. 1.3 mm. broad at base, concave, the margins and back densely ciliate except for a narrow, longitudinal, subglabrous strip adjacent to margins. Corolla white, the petals oblanceolate-oblong, ca. 6 mm. long, ca. 2 mm. wide towards apex, united at base, erect, spreading or slightly recurved at apex. Stamens with filaments as long as petals. Carpels ca. 2 mm. long with short recurved styles, the squamæ broadly obovate and concave, 5 mm. long and 5 mm. broad across truncate tip, yellow.

Known from a limited area in the vicinity of Aus, South West Africa, in crevices of white quartz outcrops at 1400 meters altitude, usually associated with *Anacampseros Dielsiana* Dinter. Flowering at least from March to June. Chromosome number: 7 pairs.

Aus, Dinter 3584 (BOL-type; UC-fragm.); Aus, Dinter 6165 (BOL); locality unknown, from Dr. Meredith Morgan, filed as voucher for chromosome count, Univ. Calif. Bot. Gdn. (Berkeley) No. 49. 2030 (BOL, US).

The type sheet bears three additional specimens of horticultural origin.* They are annotated "Stell, Univ. Gdns. No. 6231, Flor. April, Anno 1933," "Aus, Flor. March-April, 1930, petals

*Not shown in Fig. 62.



FIG. 61. *Crassula ausiensis* P. C. Hutchison. 1, habit; 2, flower; 3, flower with 2 sepals and petals removed; 4, petal; 5, sepal; 6, squamæ. 1, nat. size; 2-6, x 5.

2½ lin. long, white, N. B. G. 1841/27, S. W. A. expd," and "B. H. 24047, Namaqualand, e hort Stell. Univ. Gdns. Flor. 17th April. 1947." Another sheet at the Bolus Herbarium (No. 24585) is labeled "South-West Africa: Warmbad, e hort Stellenbosch University Gardens."

Warmbad and Aus are some 300 kilometers apart by air. Until material is filed which is not of horticultural origin, the citation of Warmbad as a locality for this species needs further confirmation.

All of the horticultural material cited above agrees with the type in every respect, however living material from Warmbad collected (?) by Geyer, 1948, differs from the type in many respects: the petals are shorter; the sepals longer; the bracts larger and more conspicuous; the leaves longer, thinner, often somewhat obliquely twisted, often somewhat convex on the surface, and the surface cilia less conspicuous and more evenly distributed. Until additional field material and data are available, the Geyer collection from Warmbad cannot be definitely

The species is unique for its stout, contorted stem covered with a scaly bark. It is evidently very slow-growing since the Morgan plant, which is at least 20 years old, is no more than 12 cm. in diameter and 8 cm. tall. The stout scaly stem is most conspicuous on this cultivated plant, but is evident also in the portions of plants which Dinter collected and dried. Peduncle length is somewhat greater in the cultivated material, as is usual in this genus; the Dinter collections have peduncles 2 to 5.5 cm. long. Also the peduncles are more spreading in the cultivated material—in the Dinter material the flowers are subcapitate. Young plants in cultivation at the University of California Botanical Garden (Berkeley) commonly have larger leaves and rosettes and the leaves are inclined to be obovate and less compactly arranged. In older plants, the decussate leaf arrangement becomes less apparent and the leaves become smaller and more oblong. Leaf shape and size are extremely variable on the same plant. The bracts may be basal (and larger), sub-basal, or inserted even ⅔ the distance up the peduncle, or in any combination of these positions.

I wish to express my appreciation to the following people who have generously contributed to the preparation of this paper: Dr. Louisa Bolus, Dr. Meredith Morgan, Sr., Mr. H. Herre, Dr. C. H. Uhl (for the chromosome count), Dr. Rimo Bacigalupi (for the Latin diagnosis), Dr. Lincoln Constance, Dr. Helen-Mar Wheeler and Dr. T. Harper Goodspeed.

FROM ONE WINDOW SILLITE TO ANOTHER MORE POTS TO YOUR WINDOWS

"If I were to tell you that I have over 100 pots in one window, you might conclude that there must be enormous windows where I live, or else you would give me the old-fashioned look.

Actually it is quite a simple matter. I have put up a number of shelves close to the panes and all the way up.

I bought some 1 inch square timber and cut it into lengths to fit across the window panes between the main uprights. Two such lengths are required for each shelf. To support the shelves I used short bits from the same timber and nailed them to the window-uprights.

The two shelf-lengths are laid on top of the supports about ½ in. from the window pane and ¼ in. apart, the pots are put on without the usual saucers so that the drainage holes come over the space between the two shelf lengths. Watering starts at the top shelf and with good drainage it runs through pretty freely to the plants below which very obligingly catch the surplus. Only the lowest shelf needs either saucers or a long tray to stop the water from running over the windowsill, which incidentally is left quite clear to satisfy the female for dusting, and by the way, the plants do not get in the way of the precious net curtains either. In fact, they will hang just as the wife thinks they ought to hang."

From "The Cactulent" the official Bulletin of the
London Cactus Club

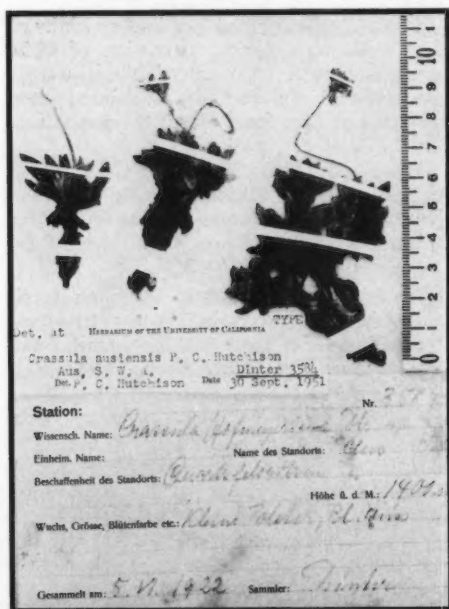


FIG. 62. Holotype of *Crassula ausiensis* P. C. Hutchinson, at the Bolus Herb., Capetown, South Africa (Bol.). The central specimen is now deposited at the Univ. of Calif. Herb., Berkeley, California (U.C.).

placed with *C. ausiensis*. It may represent a form intermediate to another species or an extreme variation on the outskirts of the range of *C. ausiensis*. It is even possible that this plant may prove to be a hybrid originating in cultivation.



FIG. 63.

THE DESERT TORTOISE

By G. MCGONIGAL

One of the most interesting dwellers in our Southwest deserts is the Desert Tortoise (*Gopherus agassizii* Cooper). In the early days it was quite frequently observed in those areas suitable to its mode of life, but nowadays much scarcer, due in great part to the thoughtless disregard of present day visitors to the deserts.

It always seems strange to see these creatures living, and seeming to enjoy it, in an almost waterless country, but they are well able to do this. In the spring and early summer months they can obtain green vegetation and this is the time when they are most active and when they are most likely to be seen.

Extremes of heat and cold they do not like, as part of an old rhyme about this tortoise puts it,

"When days are cold or very hot
He'd rather go to sleep than not."

During the hot summer days they seek the shade and during the winter they hibernate in deeper excavations or burrows. They are well able to dig, not too fast, but are very persistent about it, using the front feet and then turning

around and pushing the dirt out of the excavation much like a small bulldozer.

They seem to lead a placid existence and tend to convey the impression that time is of little significance as they go unconcernedly on their way, their gait being a sort of slow, plodding shuffle.

The female digs a shallow excavation in which she deposits her few eggs, then covering them over and leaving them to Nature's care. The eggs are white and almost round, somewhat like a ping-pong ball and are very thick shelled. Early summer seems to be the usual period of egg laying, and hatching out in early fall.

The Desert Tortoise grows very slowly and a large specimen about a foot in length may be well over 20 years of age, but so far, no exact means of determining their age is known.

They are inoffensive creatures and are well protected against their enemies, except man, by their armored covering. Much better to leave them in their desert home than carry them off to a usually unhappy and unnatural life in civilization.

Methods of Collecting Cacti for the Herbarium and Botanical Garden

By ELZADA U. CLOVER

PART II

In the event that it is necessary to dry plants without artificial heat or without any of the other methods suggested, they may be sectioned and the cut surfaces turned upward in the sun. When they start to curl, the drying cut surfaces may be peeled off, the specimen placed between driers, and put in a press with considerable pressure applied. In a few hours they may be removed from the press and placed in the sun. This process is repeated until plants are dried. It is a laborious undertaking but material can be saved in this way. Sometimes plants must be shipped before they are entirely dry. There will be some twisting or warping as they dry without pressure, making the specimens unsuitable for mounting. These may be soaked for a few minutes in hot water or until they lose their rigidity, and then treated as fresh material. They will dry quickly. Care must be taken with pubescent specimens to prevent damage of the surface vesture. Glochid-bearing species may suffer some damage in this process.

I wish to reiterate that much time and labor may be saved if fresh material is sent to a base camp for further handling instead of pressing plants as collected. Often days in the field are few and precious, and one resents taking time out to tend these slow-drying plants. Another point in favor of this practice is the difficulty involved in packing dried specimens properly for traveling over rough horse trails without breakage. Flowers, of course, will have to be pressed immediately as collected, and in the case of night-blooming cacti, these should be pressed either after they open at night or very early in the morning. I suggest the latter time, since poisonous snakes are apt to be abroad at night. Unless stems are flat or approximately so, flowers should be pressed in a separate paper. If dried rapidly, they retain a good color. Newly opened flowers are desirable as older ones have a tendency to turn black and often deliquesce.

Robust larvae are often present in fleshy flowers and are apt to eat a surprising amount of stamens and pistil if care is not taken to kill or remove them. Naphthelene or paradichlorobenzine or a mixture of the two should be a part of regular field equipment to be applied as soon as flowers are out of the press.

Most herbaria file dried cactus specimens on regulation sized paper as less space is required by this system. A few place entire plants or plant parts in boxes such as are used for filing fungi. In mounting material on sheets heavier specimens are sewed on with linen thread, tied on the back and gummed linen tape pasted over the knot. Smaller parts and flowers may be glued or attached with gummed linen strips. A sheet, to be entirely satisfactory, would include both a longitudinal and cross-section (if ribs are present); a flower with the half containing the pistil turned upward, the other half with cut surface downward so that the outer perianth segments and other features show; a mature fruit; and one photograph showing habitat and another showing the habit. These may both be pasted on the sheet if there is space, or held in an envelope provided for the purpose. Some systematists advocate making slits in the herbarium sheet and inserting corners of the photographs, holding them in place by gummed linen on the back of the herbarium paper. Full explanation including the field number of the plant should accompany the photograph. It may be advisable to use an herbarium sheet for photographs alone. Field notes, as in all scientific collecting are an essential part of the work. Plants collected without certain information are without value to the scientist. Since much has to be noted on cacti in the field, it is advisable to have forms printed in such a way that points may be checked with a minimum of time and trouble. Filling in these forms will also prevent the neglect of obtaining important information. A sample sheet follows:

Field Notes on Cacti

Date.....	Altitude.....	Location.....
Association.....	Habitat.....	
Soil.....	Exposure.....	
Name of plant.....	Number.....	
Abundance.....	Habit.....	
Height.....	Diameter.....	
Stem form		
ribs....., angles....., terete....., flat.....		
Stem color.....	vesture.....	
Spines		
Centrals....., radials....., arrangement.....		

- Leaves
 persistent....., deciduous....., none.....
- Flowers
 location on stem.....length.....diameter.....
 outer segments
 color....., shape....., tip.....
 pistil
 style, color....., length.....
 stigma, color....., lobes.....
 stamen
 filaments, color....., arrangements.....
 ovary
 areoles.....
 bracts.....
 length.....
 diameter.....
 fruit
 size, length....., diameter.....
 taste, edible....., non-edible.....
 color, outside....., inside.....
 seeds, size....., color....., markings.....
- Photograph No.....Garden specimen.....
- Additional comments:

SELECTION OF MATERIAL FOR THE BOTANICAL GARDEN

There are several reasons for supplementing herbarium material with living specimens to be grown in a greenhouse or out of doors. Field expeditions cannot always coincide with the flowering period of cacti. Contrary to the apparent opinion of many collectors, flowers and fruits are essential in the proper determination of species. Under good conditions most cacti can be induced to flower, and when growers fail to produce blooms it is usually because plants are not given a rest period which they get under natural conditions. Flowers may be studied and prepared for the herbarium to supplement sterile material collected previously. Fruits with mature seeds may be needed to complete a field record. A failure to produce fruits under cultivation may be averted especially in plants grown under glass by placing a drop of honey or syrup on the stigma before a transfer of pollen. This is essential at time in such flowers as *Selenicereus* and *Hylocereus* where the styles are extremely long.

Plants selected in the field should be free from fungi, mealy bugs and scale insects. These pests may scarcely bother a plant in the field but they flourish in the greenhouse. Plants showing much tender, young growth contain considerable water and have a tendency to wither if not planted soon after collection, and it is inadvisable to ship such material if it must go through a quarantine station where there may be serious delay.

Mammillaria and allied genera, *Astrophytum*, *Echinopsis*, *Rebutia*, *Ferocactus*, *Echinocereus* and other small to moderate sized species should be collected entire and without injury to stem or roots. Roots are usually trimmed back before replanting if shipped far, but the danger of

fungus infection is lessened if they come from the field undamaged. Medium sized specimens grow better than large or very small ones. It is always well to have duplicates as there is sure to be some mortality. In choosing duplicates, one should pick those showing variations from the original. Such genera as *Epiphyllum*, *Nopalxochia*, and *Rhipsalis* may be sent entire, or clumps divided if unwieldly. Sections of stems may be grown successfully if mature vigorous ones are selected. For long distance shipping, delicate material should be wrapped in waxed paper, thus preventing excess evaporation.

Vine-like or tree-like cacti must be sectioned



FIG. 64. *Hylocereus triangularis* (1.) Br. & R. These large flowers are preserved well if dried rapidly. White flowers tend to turn brown if flowers are old or if drying is too slow. The epidermic has been removed from lower side of stem to facilitate drying.

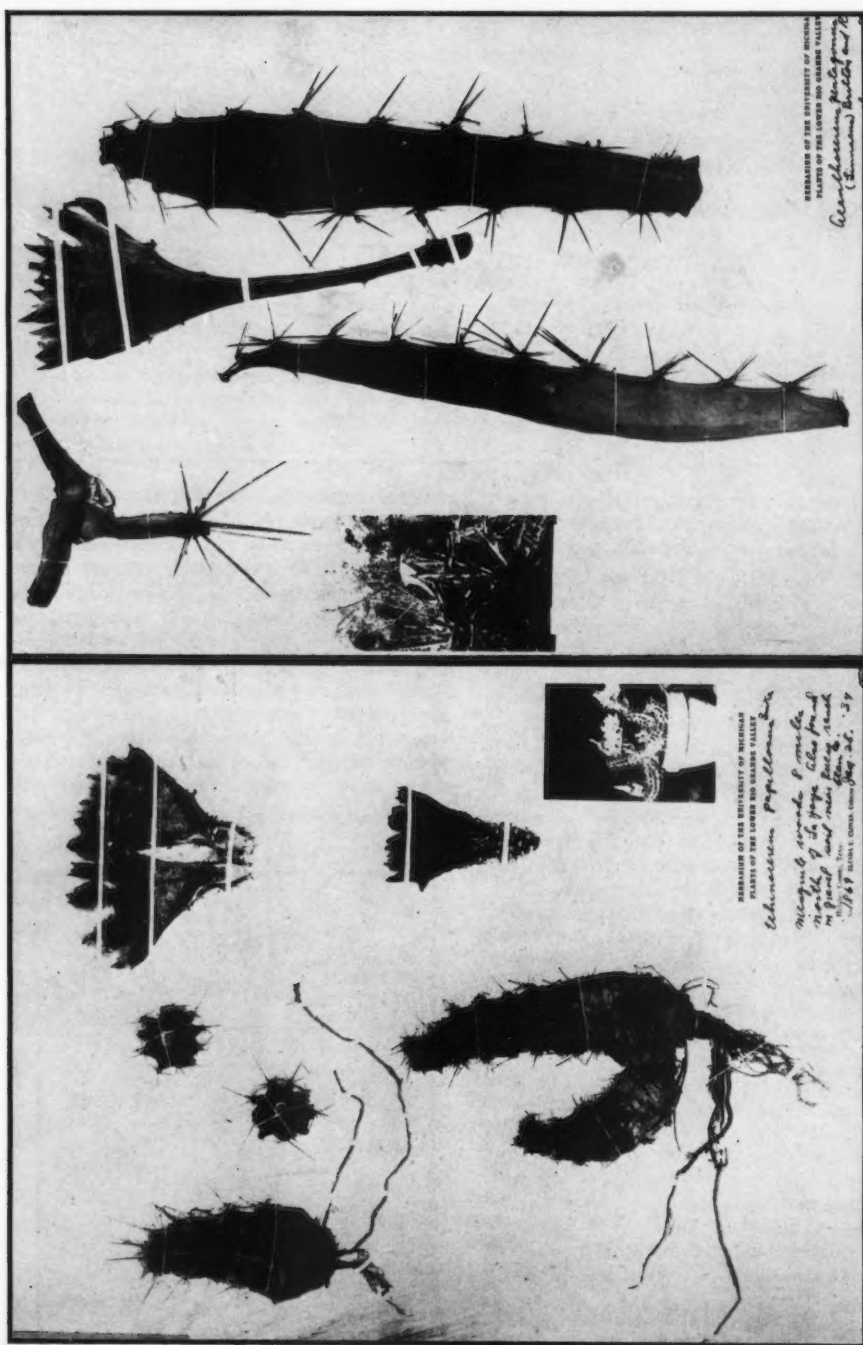


FIG. 65. *Echinocereus papillosus* Linke. (Left) Small plants may be split lengthwise and the entire plants including roots mounted. This sheet shows halves of two different plants. FIG. 65b. *Acanthocereus pentagonus* (L.) Br. & R. (Right) Cross-sections of this type of stem are difficult to make because the wings are narrow and the central cylinder large and very woody. It is advisable in many types of cacti to collect some terminal growth. Color of spines and wool are truer in young growth, and some species lose wool and at least some spines with age.

unless satisfactory seedlings can be located and sections should be left in semi-shade for a few days or until a callus has formed over the cut surface. If plants must be shipped immediately after collecting them, a coating of charcoal (always available where wood is burned) will help to prevent the growth of fungi and consequent decay. A coating of sulphur will suffice but is not so easily obtainable. Sections approximately a foot long are suggested since that length is easy to pack and they are convenient to handle in planting.

Mature but not old pads of *Opuntia* should be selected, as young ones wither and die if planting is delayed. Old ones may remain alive for years increasing in size but never sending out new growth. A pad which is to be planted should never be severed at its junction with the one immediately below but at least half of the lower one should remain attached. Contrary to common opinion that all *Opuntia* species grow like weeds under any treatment, this genus is perhaps one of the most difficult to root successfully in northern climates unless good material is provided.

Year-old branches of *Pereskia* and *Pereskioopsis* are preferable to younger ones. These should be wrapped in waxed paper for distant shipping. Young material grows well if planted within a short time.

Cacti grown from seeds adjust themselves readily to greenhouse or garden conditions even in species that usually die after a brief time away from the natural habitat. It is therefore important to obtain seeds whenever possible. Fruits may be allowed to dry and the seeds removed at time of planting. Do not wash seeds even though it may be necessary to separate them from the fruits for shipping.

Care should be taken in packing specimens in the field so that spines are not broken, and so that injury from gouging is prevented. Wadded newspapers make good packing, and "spanish moss" may be used with satisfactory results. Heavy leaves or bark may serve as packing material, and valuable specimens may be entirely enclosed in strips of bark and tied securely. Plants should be packed tightly in a container to prevent jolting.

Cacti selected for foreign shipment should be entirely free from soil, debris, or contamination by fungi or insects as such a condition will condemn them at a quarantine station. Be sure that specimens are free from moisture before wrapping, and delay packing as long as possible before shipping since plants will send out a pale, unnatural growth which is susceptible to attack by fungi.

DIG YOUR OWN

In the March-April issue of the JOURNAL there appeared an article "It's Cheaper to Buy Them" discussing the relative costs of buying or collecting cacti. Living in the state of Michigan 2000 miles away from good cactus collecting country the question is of academic interest only. However, lest some would-be collectors become discouraged I would like to present our experiences with rock collecting which, after all, is a good deal like cactus collecting.

For several years we have been making trips to collect rocks and minerals and last year we went on a 2000 mile trip in Canada and the Upper Peninsula of Michigan. The party consisted of 4 adults and 2 children and the trip took 7 days. We had a gasoline camp stove and cooked our own meals. Cash expenses were as follows:

Cabins (six nights).....	\$54.00
Food	31.40
Car expense.....	46.72
Total	\$132.12

We brought back a quantity of rocks which probably could have been purchased from a dealer for \$20. So looking at it from one angle we would have saved a lot of money by staying home and buying the rocks.

But let's look at it from another angle. Thousands of other people were travelling in the Upper Peninsula who did not collect anything. Obviously then the trip itself—the scenery, etc., was worth the amount it cost us. Looking at it this way the rocks didn't cost anything. Furthermore our quest took us off the main roads and it's usually the side roads that lead to the most interesting places.

Here are a couple of other angles to the situation:

A serious collector digging a plant out of its native habitat gets more than just a plant; he gets first hand knowledge of the conditions under which the plant grows.

A collector digging his own plant takes pains to get it out in as good a condition as possible and to plant it as soon as possible. A dealer in collected plants is primarily concerned in making money. He doesn't have the time to "baby" an individual plant. There are even dealers who don't particularly care if the plants they sell live or not. A strong statement, but look at this: A year ago while walking past the plant counter at a downtown Detroit dime store my attention was attracted by boxes of assorted Texas cacti seemingly in blossom. Examination revealed 1/2" paper flowers of various colors stuck with pins to the *Opuntias*, *Mammillarias* and *Echinocerei*. In some spots rot had already started where the pins were stuck into the Cacti! Not only had

Concluded on pg. 119

Notes on a New Group of *Pereskias*

By HARRY JOHNSON

Within the eastern drainage of the Andes mountain chain between southern Ecuador and central Bolivia are found three species of *Pereskia*, unique among their kin. Two were imperfectly known species and the third will be here described. The oldest known of these species is *Pereskia humboldtii* (H.B.K.) B. & R. Humboldt first encountered it near Jaen, about 150 years ago, and with his two friends described it as *Cactus horridus*. At this time almost any cactus was liable to be described as in the genus *Cactus*, broadly following Linnaeus who for some reason in 1753 decided to include several well established old genera in a catch-all group.

Jaen (pronounced Hay-ain') is in northern Peru, an ancient, small town in the valley of the Marañon River north-west of its junction with the Rio Huancabamba. The upper third of the Amazon River, mostly in Peru, is called the Marañon. The few naturalists who have penetrated to its banks were attracted by the romance of gazing on its fabled, murky waters. To reach it my companion and I had crossed the lowland deserts and climbed to Abre Porculla at 2200 meters. This is the lowest Andean pass and separates the streams that flow to the Pacific from those that make the long, 2,500 mile journey to the Atlantic via the lower Amazon.

In 1912 Dr. Weberbauer had made the trip and, succeeding in finding one plant, had sent it to the Botanical Museum at Berlin. These were the only two known collections of *Pereskia humboldtii*. This plant and its two related species form a distinct sections of the genus. The main points of difference are in the fruits and the clustered, axillary flowers. The fruits are small, soft, blackish-red berries $\frac{1}{4}$ inch or less in diameter looking somewhat like black currants. They contain 5 to 8 small black seeds. The flowers are small, $\frac{3}{8}$ to $\frac{5}{8}$ inches in diameter, red or white, and are borne in clusters of usually 3 but often 1 to 5, in the leaf axils of the secondary branches. The plants themselves are more shrubby and less tree-like than the rest of the genus. They branch from the base throwing up long canes more or less divaricate, which, on the upper third, bear many, twiggy, short branches which are zig-zag as they bend away from the alternate leaf bases. As these canes become aged they are more divaricate and as the newer canes gain vigor slowly die away.

Probably more species will be found along the selva on the eastern flanks of the Andes and the dry lower valleys running north and south with their tributary western streams. This region is but little known and probably will remain so for many years to come for there are but few villages

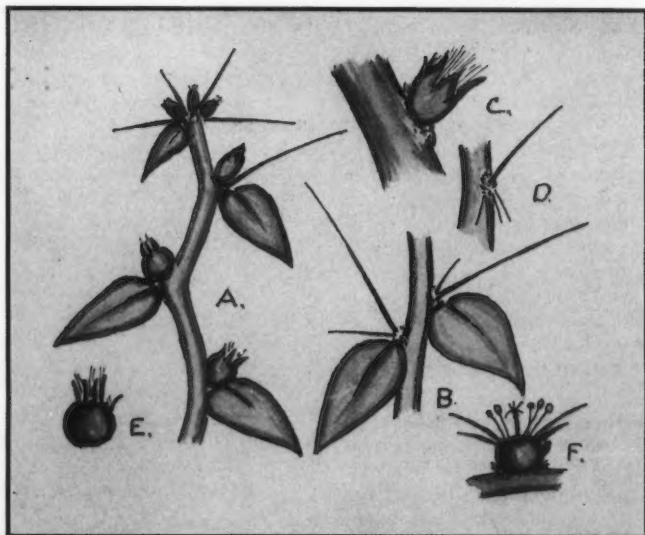


FIG. 66. *Pereskia vargasii* sp. nov. A: Branch showing buds. B: Leaves and spines on vigorous young shoot. C: Close-up of bud. D: Areole with spine and hairs from base of areole. E: Mature fruit showing erect, persistent outer perianth segments with axillary hairs and the single scale near top of the fruit. F: Cross-section of flower.

and fewer roads. Below is a revised description of *Pereskia humboldtii*.

Pereskia humboldtii (H.B.K.) B. & R.

Tall shrub or small tree 2 to 6 meters high divaricately branching from the base, the upper, secondary branches slender, terete, bent at the leaf-bases; areoles small, less than 3 mm. in diameter, circular, filled with felt-like white or light brown wool with few longer hairs 2 to 6 mm. long; spines often solitary, sometimes 2 or 3, slender, pungent, yellow when young, grey to blackish when old, unequal, the longest 2 to 3 cm.; leaves solitary, alternate, ovate to oblong, acute, 2 to 3 cm. long, subsessile, entire, glabrous, fleshy; flowers borne in the leaf axils, on secondary branches, 3 to 5 together but opening one at a time, about 1 cm. wide, pedicels very short; outer perianth segments generally 5, triangular, acute or acuminate; inner segments generally 5, ovate-lanceolate, spreading, red or orange-red; ovary small, 2 mm. with short scales, one upper scale large, axils filled with long white hairs; mature fruit a dark red, globular, soft berry less than 6 mm. in diameter, the upper scales with long white hairs in the axils; perianth more or less persistent; seeds black, smooth, shining, lenticular to ovoid, 1.5 mm. long; hilum oblique, white within.

TYPE LOCALITY: Jaen, Peru. 740 meters.

DISTRIBUTION: Valley of the Rio Huanabamba between Pucura and Jaen. 740 to 1,000 meters altitude. Not observed on the mountain flanks but on the valley floor.

I observed several plants. These were in flower in October. The rainy season was starting in earnest as we left the lower valley. This region, which lies just below the equator, is hot and dry and bears in the valley a sparse, xerophytic scrub forest, partially dry-season deciduous. The mountain flanks are fairly barren with few shrubs. Characteristic plants of the valleys are the fat-trunked, silk-cotten trees called Barigos, Bougainvilleas in pink and red, spiny Acacias and numerous tree cerei and other cacti.

Pereskia vargasii sp. nov.

Frutex vel arbor parva altitudine 2-4 m, caulibus 1.5-2 cm. diametro ad basim divaricate ramosis et frequenter procumbentibus superne corymbose ramosis, ramulis teretibus gracilibus 10-20 cm. longis quam ramuli *P. humboldtii* crassioribus; foliis alternatis in nodo solitariis et sessilibus 1.5-2.5 cm. longis modo ovalibus modo ovatis in apice acutis, plerumque quam folia *P. humboldtii* majoribus et crassioribus; areolis parvis rotundis, pilis sericeo-albis praesertim in ramulis juvenibus dense lanatis et spinas 1-2.5 cm. longas juvenes stamineas veteres praesertim ad apices fumosas ferentibus; floribus albis 3-5 in foliorum axillis fasciculatis, 1-1.5 cm. latis; ovario 2-3 mm. longo squamis in axillis pilosis superioribus frequenter foliolosis ornatis; petalis exterioribus viridibus, 5 acuminato-deltoides in axillis albo-pilosis, interioribus purpureis vel roseis 5 ovato-lanceolatis acutis; staminibus 00 quam petala brevioribus et antheris sulfureis; stylo

breve; stigmatibus quadripartito rubro; baccis pulposis ad 6 cm. diametro vinaceis etiam fere nigris bracteis in axillis pilis sericeo-albis pus minusve ornatis; seminibus 1.5 mm. longis atris laevibus ovoideis vel tumidis vel compressis.

Tall shrub or small tree 2 to 4 meters tall, divaricately branching, older stems often lax or procumbent, stems 1.5 to 2 cm. in diameter, branching on the upper third into slender, terete twigs 10 to 20 cm. long, borne generally in a horizontal plane, somewhat stouter than *P. humboldtii*; leaves solitary, alternate, subsessile, glabrous, broadly oval to ovate, acute, 1.5 to 2.5 cm. long, somewhat larger and more fleshy than in *P. humboldtii*; areoles small, circular, felted with white wool with few to many silky-white hair up to 1 cm. long, particularly on vigorous young growth; spines 1 to 3, acicular, pungent, 1 to 2.5 cm. long, pale straw-yellow when young, grey with blackish tips when old; flowers borne on branchlets in leaf axils in clusters generally 3 to 5, small, 1 to 1.5 cm. in diameter, white; ovary small 2 to 3 cm. bearing scales the axils with hairs, middle and upper scales sometimes leaf-like and with longer hairs; outer perianth segments 5, triangular-acuminate, arranged as sepals, bearing white, axillary hairs; inner perianth segments 5, ovate-lanceolate, acute; stamens 00, shorter than the perianth; anthers bright yellow; style short; stigma 4-rayed, reddish; mature fruits soft berries less than 6 mm. in diameter, wine-red or almost black the upper scales and outer perianth segments upright, axils with silky-white hairs; seeds black, smooth, shining, lenticular to ovoid, 1.5 mm. long.

TYPE LOCALITY: East bank of Rio Marañon opposite Bella Vista, province of Jaen, northern Peru. Elevation 500 meters.

DISTRIBUTION: Apparently below the main range of *P. humboldtii*. It was also found above Bella Vista on the west side of the river. The plants were not plentiful. The flowers, though mature, were not found expanded and apparently open but a short time each day or night.

This species was first found by my companion Dr. Cesare Vargas who discovered a small plant just at dusk after we had crossed the Marañon by cayuca and were examining the tops of the bluffs fronting the river. This side was drier than the west side and apparently became progressively drier toward the east.

The third species belonging to this group is *Pereskia Weberiana* Schumann. It is native to Bolivia, northwest of Cochabamba, altitude 1,400 meters. From published descriptions it agrees closely with the two foregoing species though descriptions of the mature fruits were apparently overlooked. From its geographical position one is irresistibly led to infer that the lowlands of eastern Peru will contain other linking species.

FLOWERING CACTI IN IDAHO

By CARL HENSCHIED

At the last Convention I showed Kodachromes of some of my cacti in bloom and have received some very undeserving compliments since I am only an amateur and had my camera just one year at that time. I have, though, been fairly successful in flowering my plants, but it happened to me only through sheer necessity. For, having no good way to heat my small greenhouse, built of fourteen 3 x 6 foot hotbed sash (seven on a side), when the weather gets too cold the first part of December, they go into confinement in the basement. That is the time the buds are born.

At first it hurt me to carry all those wonderful plants into the basement since I have about 800 species and varieties of very fine cacti and succulents. They are mostly cacti, however, for a very good reason: succulents do not like my "basement treatment." I am sorry about this for I really like the other succulents!

When my plants take up their winter abode, the basement is cool (it is without furnace) and the temperature remains around 38 degrees. It does not vary more than four degrees either way in all of December, January, and the first part of February when they are again brought into the greenhouse. During the cold days outside in early spring and late fall my greenhouse is heated with two 600 watt electric elements. I throw a canvass over it at night and temperatures have gone down to five degrees above zero without harm. Winter temperatures frequently read between 8 and 30 degrees below zero here in southern Idaho necessitating further protection than my slightly heated glasshouse affords.

Most of my cacti look exactly the same in the spring as in the fall—all they do is rest. I water them just enough to keep them from completely drying out; that is about once a month. I do not know if my watering technique has reached any state of perfection, but it might be sufficient to say that so far it has not been too harmful (*Melocactus* excepted).

That brings up the subject of loss. I do lose some and do not advise handling really valuable plants that way, but it is surprisingly low. My greatest loss, however, is in the other succulents. For example, *Stapelias* are difficult. If you do not water in winter, they shrivel until they are almost completely lifeless, and if you do water, they rot. Loss is less if one is lucky enough to get them well hardened in the fall. *Haworthias* and *Aloes* do well with light watering in winter for they seem to cast off last year's roots and

start new ones the next year. *Euphorbias* do well. My *E. obesa* does not mind. But *Sedums* are a failure: if they do not die they etiolate to a horrible state in spite of the low temperature. The *Mesembrianthemum* do fair, with some loss, however, and with the added disadvantage of losing the flowers since many of them bloom too late in the winter to make it before the really cold weather sets in. South African plants have that tendency because the summers are opposite from ours, and seem adamant in clinging to it. *Crassulas*, *Kleinias*, *Adromischus* and others resent "basement treatment," but you can save most of them if, like me, you have to have them.

Desert varieties of cacti on the other hand put forth flowers as a reward for the winter rest. I have never lost any of my *Lobivias* (around 45 species). A few of them put out the next summer but I manage to save them. All of the others, however, bloom almost to exhaustion, even small plants. *Echinopsis*' are a close second, and I use them as the stock in grafting. *Rebutias* and *Gymnos* are also very good. In fact I should say that of the *Echinocereanae* and *Echinocactanae* do well. *Ariocarpus* types want less water in winter and *Aztekium ritteri* bloomed more profusely this year than last. *Ferocacti* and *Notocacti* are on the easy list, but the *Astrophytum*s are on the touchy side.

Of the other groups, *Mammillarias* are almost with no loss, but I have failed utterly with *Melocactus*, and I know I was too generous to them in the summer and even the winter. *Epiphytes* should never be put in the basement. My 50 kinds of *Orchid Cacti* give me very few flowers: I unfortunately have no sunporch where they would do well. *Pereskias* also resent it. Some *Opuntias* do well on the dry side, but some develop spots. Someone may know the cause, I do not. Of the *Cereanae* and *Hylocereanae* some do not do so well and I always expect some loss; but not *Trichocereus* which are in the class with *Echinopsis*.

Once I ordered all the species of *Wilcoxi*s listed in the catalogue of Johnson's Cactus Gardens. They were grafted on fast growing *Selenicerei*, and all of the stocks died leaving the scion weak or decaying before I discovered them. I salvaged most of them, rooting them the next spring and they flower wonderfully on their own roots while quite small. Perhaps that is another thing about "basement treatment," all plants seem to flower while small. I got a cut of an unnamed *Lobivia* one spring the size

of my thumb, and the next spring it had five beautiful flowers one day and several more some days later. A *two-inch* plant of *Lobivia driveriana* had a *four-inch* blossom opening flat on one of our hottest days. It is no wonder that Backeberg calls it one of the most beautiful of the *Lobivias*. *Aporocactus* does better in a warmer place in winter a bit near Orchid Cacti and *Selenicerei*.

Soils do not seem much of a problem, for we have a very sandy loam soil with a lime tendency. All I do is add some humus and some fine sifted gravel and growth is all one could wish for. Have tried adding lime but does not seem to make much difference. The several kinds of plant foods, that I tried, do not seem worth bothering with, so I just leave good enough alone (and with pictures to prove it).

In conclusion I might say my observations would be to place special emphasis on winter rest—if you want flowers! In fact the Peanut Cactus will not bloom otherwise. If I had a heated greenhouse, however, I would know

what to do with those that do not bloom.

I have tried to keep my collection in keeping with the room available and selected the smaller types of plants, so my collection is lop-sided on the side of *Echinocereanae* and *Echinocactanae*. In the rest of the *Cereeae* there are plants that are not expected to bloom and some that bloom well.

For instance; *Nyctocereus serpentinus* blooms well and I have one six feet tall, but my two foot *Carnegie gigantea* just lives and I am proud of it. The same is true of *Cephalocereus senilis* and *Oreocereus celsianus*. *Peniocereus rosei* has not yet bloomed. *Espostoa* and *Myrtillocactus* are hard to keep going. *Harrisia martinii* and *Monvillea spegazzinii* bloom but have not gotten any *Selenicereus* to bloom. Besides these I have few others in the *Hylo-seleni-cereanae* triangle, and am still determined to make a success of *Melocactus*! I have some fine *Tricocerei* and some bloom, and expect more as time goes on.



FIG. 67. Collecting cacti near Denver, Colorado, during the 1951 Convention. Left to right: M. L. Willis of Denver; President Harry Johnson, Jr. of Paramount, California; and Robert Killian of Corona, California. Photo by Fred Eisele.

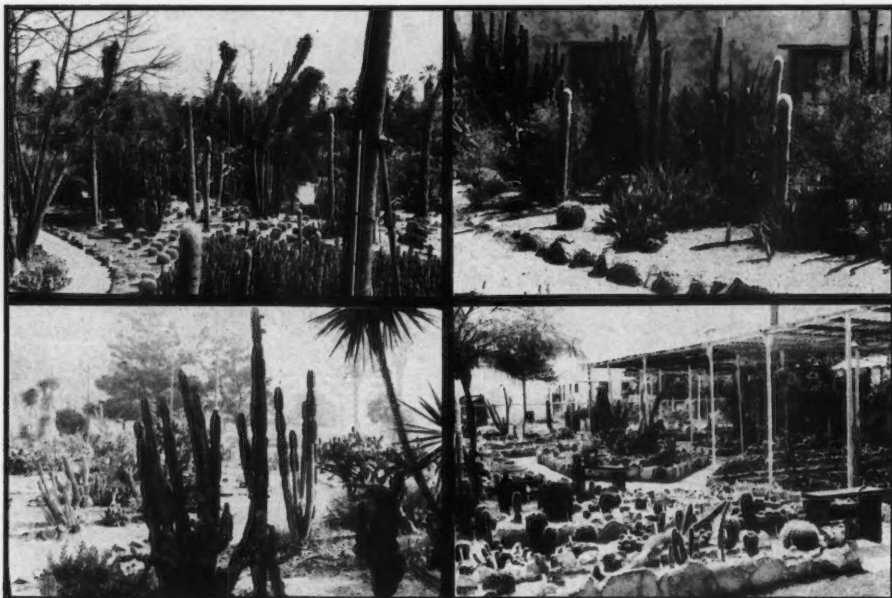


FIG. 68. (Top left) Huntington Botanical Garden, San Marino. (Top right) Desert Botanical Garden of Arizona. (Lower left) Cactus garden in Recreation Park, Long Beach. (Lower right) The author's garden, Los Angeles.

Growing Cacti Out of Doors the Year Around

By HOMER RUSH

In any discussion of growing cacti out of doors, the question immediately arises, in what part of the country do you live. The weather in different portions of the country has a great control over what we can grow and how well we can grow it out of doors.

Here in the west, in Southern California, Arizona, Nevada and New Mexico many of the cacti grow out of doors all year around with only an occasional winter which is cold enough to cause any amount of damage. Of course this does not mean that all plants from other sections of the Western Hemisphere will do as well as the plants which are native to the area but some of the South American cacti do very well here.

In the states from the central part of California to the Canadian border and extending in this line clear to the Atlantic ocean, the number of cacti which can be grown out of doors the year around is very greatly reduced and in many areas is limited to a few species of *Opuntias* which will be dormant under the snow and do not seem to be bothered by the cold and excessive moisture. This group includes *O. opuntia*, *O. erinacea* in some of its various forms, *O.*

vulgaris, *O. rafinesquii*, *O. polyacantha* and *O. tortispina*.

In some of these northern states there are a few other native species of cacti such as *Echinocereus viridiflorus* in Wyoming and *Pediocactus Simpsonii* in Washington and Idaho.

These facts tend to give the idea that in order to grow cacti out of doors it is more or less necessary to confine the plants of your garden to those which are native to areas more or less like your own in so far as winter weather, climate and rainfall are concerned.

Many persons living in the northern and eastern states, where winters are very severe and the rainfall is quite heavy, have tried to add to their outdoors gardens, plants which are native to Mexico, Texas, New Mexico, Arizona and California and have become discouraged because these plants could not exist through the severe winters.

There are many species of cacti which are native to the high mountain regions in the United States, Mexico and portions of South America which in their natural habitat are subjected to similar conditions as those in the northern and eastern portions of the United States. These

should in all probability do well in an outside garden the year around.

The hardness of many of the species of cacti has never been definitely established for the differing conditions to which we subject them and most of us have to resort to the trial and error methods when we select plants for our outside gardens.

Even here in Southern California in 1937, 1948 and 1949, many of us lost a great number of cacti when a sudden cold spell sent the temperature down below freezing, the loss due largely to the fact that the plants had not been allowed to become dormant before the cold spell, as they naturally do in their native home.

For those collectors who have a glass house, the problem is somewhat simplified as the plants can be moved into the glasshouse before the first frost comes, and be kept there until it is again safe to move them back into the garden where the pots are usually set into the ground (plunged).

Of course, it is always possible for the collector to house his plants in the windows of his home during the winter but when doing so, care must be used in order not to water too much and to keep the plants turned around often so the sunshine will fall on all sides of the plant for part of the time.

Plants wintered inside either in a glasshouse or in the house windows must be very sparingly watered, possibly as little as once a month, and should be given as much sunshine as possible to combat the short, dark days of the northern and eastern parts of the country.

For those gardeners living in the northern portion of the United States, the outdoor garden problem is much simpler; the principle thing to remember is that good drainage is a necessity for cacti native to the deserts. In order to obtain good drainage it is necessary to build up the garden beds to as much as eighteen inches above the level of the garden, making the lower portion out of coarse rock, bricks, broken pots or other coarse material and then covering this to the depth of at least one foot with coarse sand and garden soil in equal parts. It is usually a good practice to build the center of the bed somewhat higher than the edges so that drainage will be accelerated.

There is a mistaken idea that cacti do not require any water. This is not the case, as most species of cacti will accept and benefit by a rather plentiful supply of water during their growing season, at which time they may be watered every day.

A summary of the controlling factors in successfully growing cacti out of doors consists of five principle points: soil, exposure to sun,

water, temperature variations and general weather conditions. Possibly "soil" is the most important of the five because if your soil is right you will automatically offset some of the bad features which might result from poor conditions in some of the other points.

It is important to consider "exposure to sun" regardless of whether your plants are all cacti, all succulents or mixed.

"Water" is possibly the point upon which more amateur growers fail than any of the others and when the question of when to water and how much has been answered, much of your worry about plants has been removed.

Consideration and analysis of "temperature variations" may be the deciding factor in determining whether you have plants that will flowers or just plants.

"Weather conditions" confuse many growers as they do not understand that many plants cannot be successfully grown out of door in locations where there is much cold weather or many cloudy or rainy days.

Thus we find that by having the right soil, a good porous soil which drains quickly, learning to control the water by not watering too heavily but oftener, learning which plants need full sun and which want some shade, becoming thoroughly acquainted with the daily temperature variations and learning which of the plants will stand cold and cloudy days, it is possible to make a success of building an out of doors garden in nearly any section of our country but this is only possible by continued care and study of the five points and the plants.

* * *

DIG YOUR OWN—Continued from pg. 113
the dealer damaged the plants, he had deliberately tried to cheat unsuspecting beginners by creating the impression that the plants were in blossom.

Fortunately such dealers are few and far between but the fact remains, there are advantages to doing your own collecting that can't be evaluated in terms of dollars and cents, or dented fenders, either.

So I say if you can possibly do your own collecting—do it. Charge the expenses of the trip to "overhead" and you will have your plants for nothing.

RICHARD KOLASINSKI.

* * *

Mrs. Thomas of the Loomis Ranch discovered a freak bifurcated *Yucca Whipplei* at Chilao Flat in the San Gabriel Mountains near Los Angeles, at an altitude of 5300 feet, which was featured and illustrated in the February 22, 1952, issue of *Science*.

* * *

It is with regret that we announce the death of Mrs. Wm. L. Otte of Santa Barbara on June 16. She was known to her many friends as Nan Otte.

A CACTUS COLLECTOR IN THE ANDES

An account of a second expedition to the west coast of South America.

By HARRY JOHNSON

PART III

The following morning at daybreak we were on our way to the coast via Paso de Callan. The mountainsides were extremely dry as we slowly climbed upwards. Owing to the centuries of cultivation there were few wild plants of any kind to be seen. Near the 2,800 meter level we found an interesting form of *Opuntia exaltata* with dark red flowers and more bushy habit. This *Opuntia* is very common almost throughout Peru. It is often used as a hedge plant or to plant upon the tops of walls. Its extremely spiny character makes it an effective barrier. At 3,800 meters a new *Matucana* appeared, quite different from the one in the lower valley. The radial spines were hyaloid, the areoles often with dark centrals. The plants varied from globular to flat topped some being no more than 2" high but 5" in diameter. The slender-tubed flowers were a lovely crimson-red, the barely expanded perianth rather more bygomorphic than the *Caras* species. Looking over the rocky ledges I found three, golden-spined plants nestling closely among the grass and gravel. Close examination showed the tell-tale pectinate arrangement of spines characteristic of *Oroya*. A moment later I found it in flower. Higher up near the top of the pass I found it in abundance. This handsome new species is quite distinct, bearing pale yellow, short-tubed blossoms and green, not coppery, fruits. Above, it grew among the sparse bunch grass, characteristic of the dry puna, the brilliant golden balls compressed and close to the ground. We secured seed and flowering plants. Crossing the pass at 4,200 meters it was snowing and sleeting, the mushy ice sliding off the wind-shield. On the opposite side of the pass I found a splendid new white haired *Tephrocactus* growing in mounded clumps. The compensating thrill that makes up for all the discomforts and rigors of such trips are the moments when one finds some lovely plant or sees some glorious vista and we were having more than our share of both. *Opuntia floccosa* is well known to Andean travellers but its home is much farther south. This plant was of snowy whiteness, each head tightly packed amongst its fellows. The hair was not of the silky fineness of *O. floccosa* but coarse like the Old Man Cactus. *Cephalocereus senilis*, and quite long, intricate and curled and twisted. The chestnut-red centrals were long and flexuose. The flower was a brilliant red. After securing photos, plants and herbarium material we again started downwards

but within a moment found another small, clumped *Tephrocactus* whose top was a mass of scarlet blossoms. From a short distance it looked like a *Lobivia*. The Paso de Callan will long remain in my memory.

As we descended we came into brush country and canyons with trees. At these higher levels, where there is some rain, the mountainsides are somewhat like our California hills. Above the town of Pariacoto we found a most interesting *Borziacactus*. The bright red, zygomorphic blossoms had, on the ovary and tube, lanceolate scales—the axils with copious, long, grey and white woolly hairs. It was growing on a rocky out-cropping, the procumbent stems creeping over the slabs. The slender stems were an inch or a little more in diameter and up to 3' long. The younger stems bore brown, later grey, acicular centrals but the older portions were very different with two stout centrals the longer 3"-3½". A fiercely armed plant. An *Erdisia* grew here but the plants were quite small some 4" to 6" tall. Later, below I found it in full bloom—the bright scarlet blossoms scattered along the stems which were some 2' tall. A quite distinct new species far to the north of any known collections. Growing on the ledges with the *Borziacactus* was a pretty, blue-flowered *Petunia* with sticky, glandular foliage—the flower-spikes quite long and apparently lasting a long time.

As we reached the lower levels of the canyon a charming stream was flowing and there were willows (*Salix Humboldtiana*) Baccharis, Pepper Trees (*Schinus Molle*) *Stenolobium stans* and the common Giant Reed (*Arundo Donax*) which, though a native of Europe, is naturalized. On the walls of the canyon grew a very fine species of *Pseudoespostoa* which reached a height of 8' or more. These noble plants were a thrilling sight in the dusk of late afternoon with their snowy stems and tawny brown, heavy pseudocephalia. A very interesting small *Mila* grew in tight clumps with slender, long, brown or white spines. Among the boulders was an interesting *Melocactus* quite conical in shape. One could name many *Melocacti* from Peru. Unfortunately they are fairly similar and one would be hard put to describe them in such a way as to truly distinguish them. A few are distinct but *M. Townsendianus* seems to cover a great many of those seen up and down the coast. Darkness

NOTE: Cover illustration shows a Jivaro chief with blow-gun. Severno Vargas was my guide on the Rio Pastaza, Ecuador, H. J.



FIG. 69. *Haageocereus* sp. A typical cluster found just above the canyon mouths in the region north and south of Trujillo.

was descending but within the glare of the car headlights I saw another *Haageocereus*. There are many of these in the lower parts of the various canyons and they all seem to be related to *H. multangularis*. They are at the lower fringes of the rain belt but above the rainless coastal belt. Most are distinguished by their many, short, golden or yellow radial spines and by the presence of a few, longer, reflexed, grey centrals. This species had the typical white, nocturnal flower with coppery-green tube and lanceolate scales and peculiar "green" odor that is not unpleasant. All have the large, red, smooth fruits. They grew in basally branching clusters up to 4' tall, generally with 3 to 6 arms and were often crowded in amongst the boulders. With a flashlight I climbed about the boulder-strewn canyon floor marveling at the size of the *Neoraimondia* which grew sparsely. Here they looked as fat and heavy as *Carnegiea gigantea*. That night about 8:00 p.m. we arrived at Casma and found our way to the small hotel. Casma is a moderate sized town near the coast whose central square is ringed by great banyans. These are beautiful trees with an abundance of small, very dark green leaves which throw a grateful shade. The huge, smooth boles tower upward and drop down cascades of slender aerial roots.

In the morning we were up at 4:30 a.m. and drove up to the square to get gasoline. Gasoline

in Peru is quite cheap, about 7 cents per gallon. Peru has its own oil fields in the north at Talara which are operated by the Esso Company which has a contract, I believe, to supply the country's needs at a fixed price. The gas is an amber color and looks much like distillate. However, I was to learn that it burned in the motor beautifully and never gave me trouble. While we were waiting we had breakfast. This early meal is quite liable to be rather sketchy for Peruvians follow the Spanish custom of coffee and rolls. Generally I was able to get boiled eggs. At first Dr. Vargas had the Peruvian breakfast but as the rigors of the trip caught up with us he developed a good American appetite.

North of Casma the road followed along the coast. This is the famed Pan American highway. At this point it is paved with black macadam and in fair condition. It is quite narrow and since in Peru they do not put shoulders on the sides, the edge is broken with chuckholes and passing trucks at full speed becomes a problem of gritting your teeth and hoping for the best. I understood at once the popularity of St. Christopher—the patron saint of travellers. The desert floor is broken by many hills often granitic in character, but excursions into them net nothing as the rocky slopes are devoid of plant life. It is as though they had been burned over with a blow-torch. As in our western deserts there is

much rock pavement where the soil has been washed away or eroded by the winds leaving a tessellated layer of small stones, shiny with the patina of ages. Here and there are wide, low washes formed when cloudbursts have expended their fury on the mountains above. In the washes are mounds of sand formed around the scattered shrubs which have managed to establish themselves. *Parkinsonia* and *Cercidium* are familiar to me but one large-leaved shrub which dominates the association stumps us until we see the feathery white flowers and rock-hard, cucumber-like fruits which reveal it as *Capparis*.

Chimbote is the first town of importance we pass. Much sugar cane is grown here and also rice which is the staple food served with every meal. Most of the small towns consist of a single, rather narrow main street with the houses built right to the sidewalk line. The native shops are rather bare of things to sell though sometimes they have a surprisingly varied assortment, particularly those of the Chinese merchants. The larger towns that have more back country to draw upon are more pretentious. As we near Trujillo the *Capparis* reaches the size of a small tree in protected spots and in the washes a single plant may form a tall mound fifty feet across, topped by short stems and large leathery leaves. Just before entering Trujillo there is a tremendous wash of blown sand above where the Rio Moche enters the ocean and what was my surprise to see large, scattered clumps of a fine new *Haageocereus*. It formed colonies up to 10 feet across and grew procumbent—the stems rooting as they went forward with tips raised to a foot or so. By long searching I found both flowers and fruits. The areoles were filled with pale yellow radials with one weak, acicular, grey central. The species generally found above this region in the lower fringes of the rain belt bears quite long, stout, deflexed, light colored centrals and forms upright clumps.

At Trujillo we registered at the very good Hotel Tourista and then went to the University to find Dr. Angulo who is head of the Department of Botany. We finally found him at his offices, he is a physician, and he promptly closed his office and came with us to the university to take us on an inspection tour and to introduce us to the faculty. The institution is coeducational and the students were a good cross-section of any of our own universities. Dr. Angulo is a much respected man in his community. He founded the city's botanic garden and is well known for his good works. He kindly offered to take care of our collections and to dry our herbarium material while we went on north and also assisted us in finding paper for our presses

and cartons to hold the plants we would collect on our next journey inland. To point up the dearth of water on the coastal plain, we discovered after we had used the water drawn for our bath and in the wash basin, there was no more. Water is turned into the mains for less than an hour each day and thus this large town of perhaps 80,000 people exists without many of the sanitary conveniences. When the rains commence in the mountains the streams will flow again.

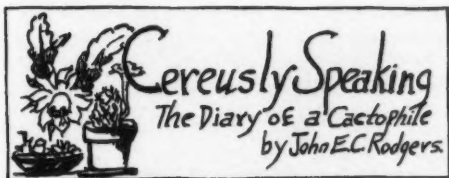
After checking our presses and repacking the plants, our friends had tea with us and later dinner at the hotel. In Peru, dinner is normally served at 9:00 p.m., so tea has a meaning. The food in the large hotels is quite like our own with the exception of desserts. The most popular dessert is a rather tough pancake which is served in many ways, rolled with various jams and sweets or with "miel de cana."

In the morning we drove north again, still not many miles from the Pacific, through the small towns of Chicama and Chocope and their vast sugar-cane plantations. There is a small railroad going up the Chicama valley and to the coast at Punta Chicama which serves the plantations. Cultivation in the coastal valleys is almost always on a large scale, the land being held by a few families who are enormously wealthy. Cotton and sugar are the export crops with the food crops being raised mainly by the Indians in the higher mountain valleys and slopes on the alto plano.

We continued on through the barren desert to San Pedro de Lloc where another short, narrow-gauge railroad runs up the valley of the Rio Jequetepeque. We drove on to the port of Pacasmayo. We had been informed that the best road into the valley was some ten kilometers north of the town rather than from San Pedro, so after searching rather vainly for a place to eat we drove up out of the valley to the junction and started our long trek into Cajamarca.

The road for the first few miles was paved but shortly we were bouncing over the washboard surface of the ordinary graveled roads of Peru. Our short-coupled British car was just right to get the full effect of it. From here on for the next two months we were to see but very few miles of surfaced road. Ahead loomed the bastions of the Andes. The portals of the gorge, through which the Rio Jequetepeque issues into the lower valley, rise stark against the jagged peaks and cumuli. The upthrust basaltic rocks are black, the lower slopes overwhelmed with white, windblown sand which has crept up the valleys almost to the crest. Not a living thing could we see above the canyon floor.

To be continued



I've used Epiphytes as my main "bone of contention" up to here but these are not the only ones that show all of the good you've done or the bad either. The Echeverias, Lithops, Gasterias, Aloes, Agaves, Euphorbias, Haworthias, Crassulas, etc. They can stand more neglect than some of the other cacti and succulents but if kept either too wet or too dry the results are both bad—etiolation or loss of roots and gradual drying back of the plants.

The Echeverias natural growth is a close grouping of leaves whether in the smaller types or the large stemmed types. Over watering causes this close grouping of leaves to be lost as well as the colors of the leaves and stems. I prefer to use a heavy soil and winter "dryness." They may not be "window-gardener-fancy-types" but they bloom and respond with rich color, stem offsets and with offsets on the bloom stems of some. I prefer my growth during the summer for these beauties.

The Aloes and Euphorbias invariably do their best when kept on the moist side during the winter with the Aloes cool and the Euphorbias warm. They have not been tamed so they must have good light so there will be etiolation. The Haworthias and Lithops are others of this clan. The Haworthias cannot be neglected too long or they shrivel, turn red and lose their roots. The Lithops usually have rough dry outer coating which protect the new green growth within from excessive changes from moisture and temperature. Even then the Lithops shrivel and draw down into the loose soil for extra protection until only the tops show like a skylight in a roof. But to understand these aristocrats is often fatal for them.

To coddle our southwestern Echinocerei and Echinocacti often means no blooms and even loss of plants while the Opuntias start unsightly stringy growth which ruins the plant and becomes the target for insects. For experimental purposes I always have at least two of any species—one I put "next to the glass" where heat and light are both intense—the other under a bench where the light is from the south but the temperature remains about 40°. I do not expect too many blooms in this "smog-region" but several are budded such as *Echinocereus Reichenbachii*, *E. viridiflorus*, *E. pentallophus*, *Wilcoxia poselgerii*, and *Mammillaria hemispherica*. I'm trying to check the results on each type I treated this way: *Echinocereus*, *Echinocactus*, *Lophophora*, *Ariovarpus*, *Fero-cactus*, *Hamatocactus*, *Thelocactus*, *Wilcoxia* and *Mammillaria* for good or bad results of each location.

The same type of arrangement is also being used for the commoner Gasterias, Aloes and Agaves as well as duplicates of several others. Too much heat or coolness seems to discourage budding of Gasterias and Aloes but encourage offsetting. The net result with most succulents does not warrant either of these harsh treatments. The "spring recovery" of these plants is slow and the "summer slow down" is retarded so the plants are often growing when they should be hardened for storage.

I find that the spring "potting fever" hits me late or not at all. From my fan mail the same seems to be the worry of most cactophiles. The soil situation has most of us worried when we have so many plants to

repot, but this does not have to be done each year. No sir or madam, I stagger this chore so that my fast growers (Epiphytes, Echinopses, Rebutias, Lobivias and most succulents) are repotted every other year while the slow growers (Fero-cacti, Euphorbias, Aloes, etc.), are repotted every third year. This makes it possible to keep the "juveniles" growing uniformly. The "adults" can be left in the same pot slightly larger than the outer diameter of the leaves, stems or ballophytic diameters. We must take up gerontology (the scientific study of old age) for our "old succulents" if we expect them to stay in good health.

I keep my pots marked with wax crayons in a variety of stars, squares, X's, etc., with a record kept in easy reach while I'm working with my plants. My diary contains this information since January 1, 1933, as well as blooming records, losses, age of seedlings, hybrids and results, weather, collectors, sources of plants and my results. Records are important for memory is elusive as we remember only that which was pleasant and successful and not all of mine have been.

In this article I've tried to show my results with coddling and neglect such as overwatering and under-watering, overfeeding and underfeeding, natural soils versus artificial chemical bolstered ones as well as the need for records of your successes and failures.

I'm writing my column this time to cover four months so I can make up in part the delay of my March-April column in the May-June issue. The letters from my English, Australian, Canadian, and New Zealand friends please me, but they make me sorry I cannot write a seasonal type of column that would better fit their needs. The only thing I can do is to tell those below the equator to add or subtract 6 months to or from my seasonal hints. The need for a "World Convention" of Cactophiles and Succulentophiles is becoming more evident each year. (I know I'd like to meet you in person next July in Pasadena, California, at our next convention.)

In May in the Lake Erie region the weather becomes warm enough at night to insure the utmost protection for the more tropical cacti and other succulents. (The others have been out since the last of April.) I give my plants no protection other than noontime shade from the grape vines from now on until mid-October (or later if it is at all possible). On June 4, 1947, and June 18, 1950, we had light frost when the temperature ranged from 34°-41°. The plants took it nicely although they were in full growth. Again the grape arbor came in handy.

Where excessive rainfall is to be expected during the hot months a well-drained but rich soil should be used. The growing habits of rarities which have not become too familiar to me (familiarity breeds contempt in some cases) are usually left in the greenhouse. If I do take them out I set them where I can watch them closely for signs of "they-can't-take-it"itis.

Our May is usually warm and sunny but this year it rained for 14 days and the humidity was terrific. So far June has been dry but light showers then sunshine have given us some of the most unendurable nights in Weather Bureau history. April had an excess of rainfall also. In spite of this abnormal season my plants look fine. The potted plants standing on the ground drain readily while those that hang from the grape arbor (pipe frame) stay cool and moist. I use coat-hangers for suspending the potted plants. I used to use raised beds of slag for drainage covered over with 6 inches of coarse sand. These kept the pots moist and gave good growing conditions, but my growing methods now produce just as good results.

JOHN E. C. RODGERS
1229—8th Street, Lorain, Ohio.



FIG. 70. Waiting for the light under a changing or soupy sky. A set-up for an extreme close-up for which the black background is used to block out confusing detail that cannot be focused in with clarity at such close range.

—Don't Wait for the Sunshine—for Color Pictures

By R. C. PROCTOR

With all the bright sunny weather that we have on the Arizona deserts the sun can become awfully shy of me when I start out to photograph cactus flowers in Spring—and again in August. If there were 364 cloudless days in a year the 365th would be the one I would have to choose to go after the picture to end all pictures. On that day, Nature, seeing me coming with a camera, would spread a white sheet over the sky and (at one time) a wet blanket over

my hopes. It never fails when I go on a long trip, yet the sun will shine all the way, right up until I begin to set up a camera and tripod.

I used to believe that Nature was deliberately playing tricks on me . . . until one day, after rejecting many tempting flower arrangements for lack of sunshine, my wife woke me up to the advantages of diffuse light from an overcast sky for close-up cactus photography. While I was fretting over the weather she admonished me to

"quit swearing... don't wait for the sunshine... go ahead and shoot. There's nothing wrong with the light." Then, in disgust, I let her take over (since she knew so darn much about it)... I was through... I wanted to pick up my toys and go home. In less than thirty minutes time, in an attitude of indifference, she shot up nearly twelve dollars' worth of film—much to my annoyance. She was completely satisfied with the weather and confident of the outcome of her careless actions.

The results of that occasion—due to the wife's part in it—were too good for my mental comfort. I felt a little sheepish about the whole affair when I saw the processed films. But from then on I have looked up to those soupy skies in an attitude of welcome; since my interest in photography is limited to cactus close-ups. Therefore, let me tell you that it is needless to let cloudy weather spoil your plans to photograph cactus flowers—close up, that is.

Any of the various methods—prescribed by light meter manufacturers—for testing light and calculating proper exposures, will do. And the results, you may discover, will be more satisfactory in some respects than those you might have achieved by working under direct sunlight—landscapes excepted. But there is greater danger of overexposure and underexposure of the film because the light from a clouded, milky sky fluctuates as the uneven cloud veil moves across the sun. Hence, the light, at the time it is tested with a meter, can register a certain degree of brightness, but by the time the camera shutter is released to expose the film it can change considerably.

Obviously, the lens opening and shutter speed must, somehow, be calculated for an exposure that accords with the brightness of the light as it is upon the flowers to be photographed... *at, precisely, the instant the shutter is released*; a detail that cannot be trusted to guesswork during cloudy weather. At this critical point my wife and I usually work together... and determine the right moment for making an exposure by the following procedure:

A light reading is taken (any method will do) and the shutter set for the exposure, after which a recheck of the light will indicate that it has changed. One of us keeps an eye on the light meter, holding it at the proper angle, while the other keeps a finger on the cable release of the camera. When the needle of the meter returns to the number by which the exposure was calculated the Mrs. gives the go sign and I release the shutter. If, after a reasonable time of waiting, the light does not return to put the meter needle back on the number by which the exposure was calculated—it becoming darker or

brighter for keeps—another reading is taken and the exposure time changed accordingly. This may be followed (but not often) by more waiting for the needle to settle on the right number before the shutter is released.

We like the idea of taking a general light reading, instead of a reading of the light that is reflected directly from the object; excellent results can be achieved by either method. We arrive at the proper light reading by directing the meter eye toward the palm of a hand whose reflection, in our case, is equal to the general light of the surrounding terrain. But in cloudy weather—since the light is not of equal brightness everywhere—the hand must be in the vicinity of the object to be photographed. Of course, the light reflected from everybody's hands would not be the same as from ours' that have been sunned to a permanent light-tan, but a small piece of gray, or neutral-colored cardboard will serve for the same purpose... after it has been tested in the sunlight with a light meter for a reading that is the same as is normally indicated by the meter for the general light on a clear day. If the object to be photographed, such as a cactus, happens to be under a tree or otherwise in the shade—in sunny or cloudy weather—the cardboard or the hand should be placed nearby for an accurate light reading. And under such poor lighting conditions they are extremely useful for accuracy.

The reason why we prefer to work from a general light reading is that each of the many colors of the various parts of a cactus and its flowers reflects light of a different quality, and while these different degrees of light may strike an average on a light meter we have found that various readings may be obtained, and are very confusing. Indeed, others may get excellent results by this method but an accurate reading of the aggregate of all the reflections from so many different shades and shapes, is an achievement that is not consistently repeated... by us. The general light reading is always reliable.

Then, the light that is absorbed or broken up and reflected by the many parts of a cactus, its spines and flowers is, after all, governed entirely by the brightness of the light that reaches them—the general light—and as long as we are careful in determining the intensity of that light as it reaches the cactus to be photographed we can be reasonably sure of a perfectly exposed film.

We realize that cloudy weather photographs are usually flat and lifeless; or rather, most of ours are. But, considering the complex spine structure of a cactus and the diversified range of delicate shades in both the spines and flowers, we have found that the light from a milky sky gives definite advantages when fidelity of detail

is desired. The delicate shades of various contrasts where there is a dense network of spines are not lost in the soft shadows that may be cast by the flowers and the larger spines. There are no burned out areas (that some of us like to call "highlights") and no blacked out voids that are sometimes called "shadows." And there is plenty of color in a cactus close-up with enough variety—the flowers, spines and stem—to give to a picture that all necessary contrast for dra-

matic effect... whether the sun shines or not. There is a metallic sheen to most cactus flowers that always reflects in the poorest kind of light, like polished metal in the sunshine, therefore it is often difficult to tell the difference between a sun lighted cactus flower picture and one made under a hazy sky. So cloudy weather does not necessarily prevent liveliness in a cactus flower photograph.

"SO YA WANNA GROW CACTUS"

By WM. MASTRANGEL, *Rocking Horse Cactus Gardens*

Part IV

AIR AND VENTILATION

There are many collectors, especially in the eastern and northern parts of the United States, who have extreme difficulty in producing flowers on their cacti. From their letters, I know that they are using proper soil, correct amount of light, and are watering according to all standard procedure—yet flowers still will not come. Why? Well, there is only one reason left, and that is improper ventilation. All the good soil, water and sunshine in the world won't keep a cactus healthy if left to grow in a small stuffy greenhouse, a poorly ventilated house or in an unventilated bay-window.

Cacti want *fresh air*, especially in the growing season, which generally runs between late February to early November. Fresh air means a continuous change of air every minute of the day and night.

In nature, cacti are exposed continuously to fresh air and wind currents which have a beneficial effect on the plant body itself. The root system too must be ventilated by means of the air reaching down through the porous soils to act as a sterilizing agent on the soils that surround the tender roots. If the soil is not ventilated, certain bacteria therein, cause unhealthy conditions. This can be detected by smelling the soil of potted plants which have been setting in an unventilated house for a few years; it is musty, rank and stale. This shows another reason why a heavy soil is not healthy for cacti.

The ventilation of cacti and other succulents must be carried on in homes, glass houses, cold frames and seed boxes. Also, if plants are stored in cellars and attics for winter protection, there must be at least a little ventilation for the plants therein. Naturally, in lath house culture, there is no worry about air, except that in certain regions in the extreme southwestern United States, there are periods during the summer when the air and winds are very dry; this condition although not

affecting most cacti, do kill off most of the epiphytes and many of the other succulents. The last named plants are happier when the air has a higher humidity.

When potted cacti or collections are grown in a house, they are most benefited when the window nearest to them is partly opened and a draft arranged so that there will be a fairly continuous current of air blowing through them. Of course in winter, the draft is not advisable—especially in the colder climes. During this period, keep the window slightly opened and eliminate the draft by keeping the other windows in the same room closed. One collector friend of mine who keeps his plants in a large bay window which cannot be opened, has placed a very small circulating fan about ten feet away from his collection and lets it run almost continuously over the plants during the growing season. The small fan is very economical and the success of the experiment is shown by the increase of his flowers.

Glass houses must be ventilated every day. Most glass houses have roof vents, however there should be some ground vents to bring an up current of air through the soils and plants. Glass house vents can be kept closed during the cool nights; during the winter one vent may be kept partly open on favorable days.

Cold frames, or hot beds—as they are sometimes called, are the most ticklish of all methods to raise cacti. Cold frames must be ventilated almost continuously, except during stormy days or frigid weather.

Of course there is no substitute for out-of-door growing conditions. Our most successful Canadian collectors place their potted plants out of doors as early in the spring as weather permits. The plants then assume a healthy growth and generally flower well. In the fall the plants then are stored in ventilated cool cellars or glass houses and placed in such a position so as to receive plenty of light.

Next month "Where to Obtain the Best Cacti."



SPINE CHATS

LADISLAUS CUTAK



The late Mr. Ira W. Clokey, a mining engineer by profession and a botanist by avocation, did extensive plant collecting in the Charleston Mountains of Nevada in the period 1936-1942. In the "Flora of the Charleston Mountains, Clark County, Nevada," published by the University of California Press in 1951, the author has provided a detailed account of the native vascular plants of this isolated mountain range lying between the southern Sierra Nevada and the Rocky Mountains, to the west and northwest of Las Vegas. The area contains approximately 656 square miles and around 699 plant entities, of which the perennials are characteristically xerophytes. The cactus student will be surprised to learn that seven genera and eighteen species of cacti are native to the region, including 10 *Opuntias*, 2 *Echinocerei*, 2 *Coryphanthas*, 1 *Echinocactus*, 1 *Ferocactus*, 1 *Echinomastus*, and 1 *Mammillaria*. Besides these cactus members, other succulents to be found are 1 *Agave*, 4 *Yuccas* and 1 *Echeveria* (Dudleya). Three of the cacti are endemics and were first described by Clokey in 1943. The endemics are *Opuntia multigeniculata*, abundant over small area east of Wilson's Ranch; *O. charlestonensis* isolated on hillsides adjacent to Griffith's Mine; and *Coryphantha rosea*, widely scattered on ridges between Kyle Canyon and Deer Creek.

Richard B. Rypma of the Texas A. & M. College made investigations of a large number of juvenile plants of *Opuntia leptocaulis* from the Brazos River Valley at intervals over a two year period and the investigation revealed that in all cases, the young plants were found to have originated vegetatively from plant parts which had fallen to the ground. This is one of the more widely distributed *Opuntias*, as it occurs throughout the southern and western part of Texas. Rypma had made several attempts to germinate seed under careful control but was largely unsuccessful, and the few that did germinate died before producing plants. It is surmised from his study that *Opuntia leptocaulis* reproduces mostly by vegetative process rather, if at all, by sexual reproduction. For more details see March, 1952, The Texas Journal of Science.

May 27 is a happy day in my life, for that is my natal day. This year, gladness was mixed with sadness when news of the deaths of two very dear friends reached me. It was on this day that Mr. Charles L. Cass of San Diego, Calif., was buried and Dr. George L. Berry of Lawton, Okla., was found dead of a heart attack in his car. Both of these gentlemen were well known to the cactus world,—the former operated a large nursery and the latter was a cactus collector and compiler of a Cactus Directory of cactophiles, which he hoped would eventually cover the entire world.

Dr. Berry was born at Tyndall, So. Dakota in 1893 and graduated from the University of Iowa medical school in 1925. His schooling was interrupted while he served with the Air Corps Medical Detachment during World War I. After serving his internship at St. Anthony hospital in Oklahoma City he moved to Blackwell, Okla., where he had a general medical

practice for ten years. In 1935 he went to Chicago to study the eye, ear, nose and throat specialty, returning to Blackwell in 1937 and remaining until 1940 when he moved to Lawton. There he became chief of staff of the eye, ear, nose and throat department at Memorial Hospital and was also a member of the staff at Southwestern Hospital. Dr. Berry was very active in various organizations, including Elks Lodge, Rotary, Kiwanis, Medical Association, Country Club, the Methodist Church, several botanical societies and a number of cactus clubs in the United States, Australia, England and South Africa.

Dr. Berry was an avid cactus collector. His greenhouse and yard were full of fascinating material. He was particularly fond of Oklahoma cacti, which he grew in outdoor beds bordering the house and fence. Mrs. Berry informs me that she has found several long articles he had written,—one on Cacti of Oklahoma, which should be of value to our readers. We will strive to get it published.

Funeral services for Dr. Berry were conducted at the Centenary Methodist Church and his remains interred in Highland Cemetery. A widow, daughter, son, stepson and four grandchildren survive him. Our sympathies are extended to the family.

Mr. Cass was a very nice old gentleman with whom I have corresponded for several years. At one time he was very active in the cactus and succulent field but of late he switched to bromeliads on a large scale. Succulents thrived luxuriantly on his place and he was able to sell plants at a very reasonable price. Some of the cactus growers criticized his low selling methods and I think that is one reason why he decided to quit the cactus game and concentrate his efforts entirely on the up and coming bromeliads. Without a doubt he started many a person on the succulent trail. I give a great number of illustrated lectures in the St. Louis area where more than a hundred garden clubs are flourishing. Members of many garden clubs are flower arrangement conscious, so I always try to stress cacti and succulents as worthy material for the practice of this popular art. After viewing my colorful kodasides of succulents the ladies would inquire where such lovely material could be gotten. It was then that I suggested each member pitch in a dime or quarter and send off two or three dollars to Mr. Cass. He was always generous with cuttings and so the ladies were well satisfied, and believe it or not, a few new succulent enthusiasts were born.

Many years ago, Cass bought W. J. Beecroft's collection of imported bromels mostly for his private enjoyment. For forty years he had been collecting Billbergias and made a number of crosses, some of them with red leaves. Last year he started to build a 30' by 40' lath house for them, since a greenhouse was not necessary in the San Diego climate. Despite his poor health and advanced age, he made a few short trips to Baja California in search of these plants. In Mr. Cass' death the plant world lost a staunch friend. There are no surviving relatives and only a few dear friends were on hand to pay their last respects to a man who shared plants with so many.

MEXICO—Continued from pg. 105

popular in Mexico than it is in this country and cheaper.

Tourist accommodations vary in type and price. All the larger cities have both hotels and auto courts that are acceptable. All places catering to tourists have dining rooms with palatable food. However, the service is often in-efficient and slow and breakfast is often too late to permit a real early start. Lunch hours are usually one-thirty to three and dinner from seven-thirty on. Even though lodging rates are set by the government tourist bureau, the rates along the main north and south highways and in Mexico City are much higher than in the cities off the main route. The splendid accommodations at Tehuacan cost only one-third what similar ones would cost in Mexico City. Acceptable lodging and eating places are spaced so far apart that the botanist who wishes to spend much time in the back country will find it better to carry his own camping equipment for occasional use.

We had no trouble with the light fingered gentry but we were advised to always keep the car locked. Automobiles are seldom stolen but accessories, baggage and anything loose may disappear. Owners of convertibles whose tops may be slashed open with a knife are often unfortunate. Many of the hotels have garages or enclosed patios where cars and equipment are safe.

Travelers checks are acceptable in all cities as well as American dollars but the travelers checks usually bring a little higher net in exchange. Bank money orders and personal checks are much harder to negotiate.

We met one young woman in deep distress because she was having to pay for many things that were supposed to have been included in the costs of her "package" tour. Purchasers of such tours should be careful to ascertain just what is included and to have proper receipts or tickets verifying them.

Many persons are affected for a time by the high altitude of Mexico City. Their troubles are usually featured by stomach disorders though others are only troubled with shortness of breath or extreme nervousness when fatigued. Those who eat food and candy sold by the street stands or are careless in their selection of drinking water may contract the "Tourists' Disease" which is a term for bowel disorders. Most of the windows in bedrooms are not screened. In some places it is well to spray against mosquitoes before retiring.

ANNOUNCEMENT—NEW CATALOG

The Rocking Horse Cactus Gardens, after months of preparation, are pleased to announce that their new illustrated brochure—listing over 200 different species of cacti and other succulents, is now available to all cactophiles. The listings are mainly exotics, including forty-five rare Arizona natives—most of which are not available elsewhere. The new brochure is novel, in the fact that it contains a list of seeds, collections, specimen clusters, crests, and miscellaneous items. There is also a page of general culture—with helpful hints. The rare imports will please the advanced collector. Another interesting feature is, that the sizes are listed, for almost every plant.

Price of the new illustrated catalog will be twenty-five cents, to help cover the high cost of printing and mailing. A free cactus will be sent with each first order, to cover the customer's investment in the catalog. Send stamps, coins or check to—

ROCKING HORSE CACTUS GARDENS

2415 W. Glenrosa, Phoenix, Arizona

Dr. P. L. Labard, 157 Norton St., Sydney, NSW, Australia, would like to correspond with other members in Australia.

FROM MEXICO

My new Cacti Price List of 1952 has just been finished. It contains a good number of new discoveries. If you really are interested in rare Cacti, just write for my list to:

FRITZ SCHWARZ

Apartado 347 San Luis Potosi, SLP Mexico

SPECIAL

Opuntia phaeacantha (Arizona purple prickly pear)
Fine pads75 ea.
Mammillaria Wilcoxia (The auburn fish-hook)
A beautiful rare "Mam." with fine auburn centrals.
Mature specimens2.50 ea.

SPECIAL—CHIN CACTI

(easy to grow and flower)

Gymnocalycium mihanovichii (The plaid chin) .75 ea.
Gymnocalycium Queblanum (The midget chin)
Creamy flowers50 ea.
Gymnocalycium saglionae (The giant chin)
A beautiful plant75 ea.
Gymnocalycium Friederickii (The rose chin) 1.00 ea.
Gymnocalycium multiflorum
(Many flowered chin)1.00 ea.

One each of above five chin cacti—3.50

Above specimens sent postpaid—cash with order.

Minimum order—\$2.00

"World Famous"

ROCKING HORSE CACTUS GARDENS

2415 W. Glenrosa Phoenix, Arizona

Registered and Pedigreed

CHINCHILLAS

Hardy breeding stock for sale
raised in rugged New England.

A PROFITABLE HOBBY

that pays dividends "Tomorrow"

"The Fur with a Future"

Prepare for the day when you wish to retire by raising the most valuable fur in the world. A true vegetarian and the cleanest animal known; is raised in cages in basements, gamerooms, garages or spare-rooms. Breeding stock is in demand today—pelts to supply the fur market is our future objective.

A Popular Hobby for Business or
Professional Men and Women

Write for prices and literature

THE HARDY CHINCHILLA FARM

HOLLIS, N. H.

RECOMMENDED BOOKS FOR BEGINNERS

CACTI FOR THE AMATEUR—Scott Haselton—\$3.15

SUCCULENTS FOR THE AMATEUR—J. R. Brown—\$3.15

EPIPHYLLUM HANDBOOK—Scott E. Haselton—\$4.00

CACTI AND SUCCULENTS AND HOW TO GROW THEM—
Scott E. Haselton—50c

VICTORY PICTURE BOOK—Hummel—50c

AMATEUR BULLETIN—Scott E. Haselton—\$1.50

GLOSSARY OF SUCCULENT PLANT TERMS—
Marshall and Woods—\$3.65

Books purchased from this office helps support your
JOURNAL. Send for 1952-53 book list.

Abbey Garden Press, 132 W. Union St., Pasadena, Calif.

